

# American Forestry

JUNE

1911

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By E. T. ALLEN

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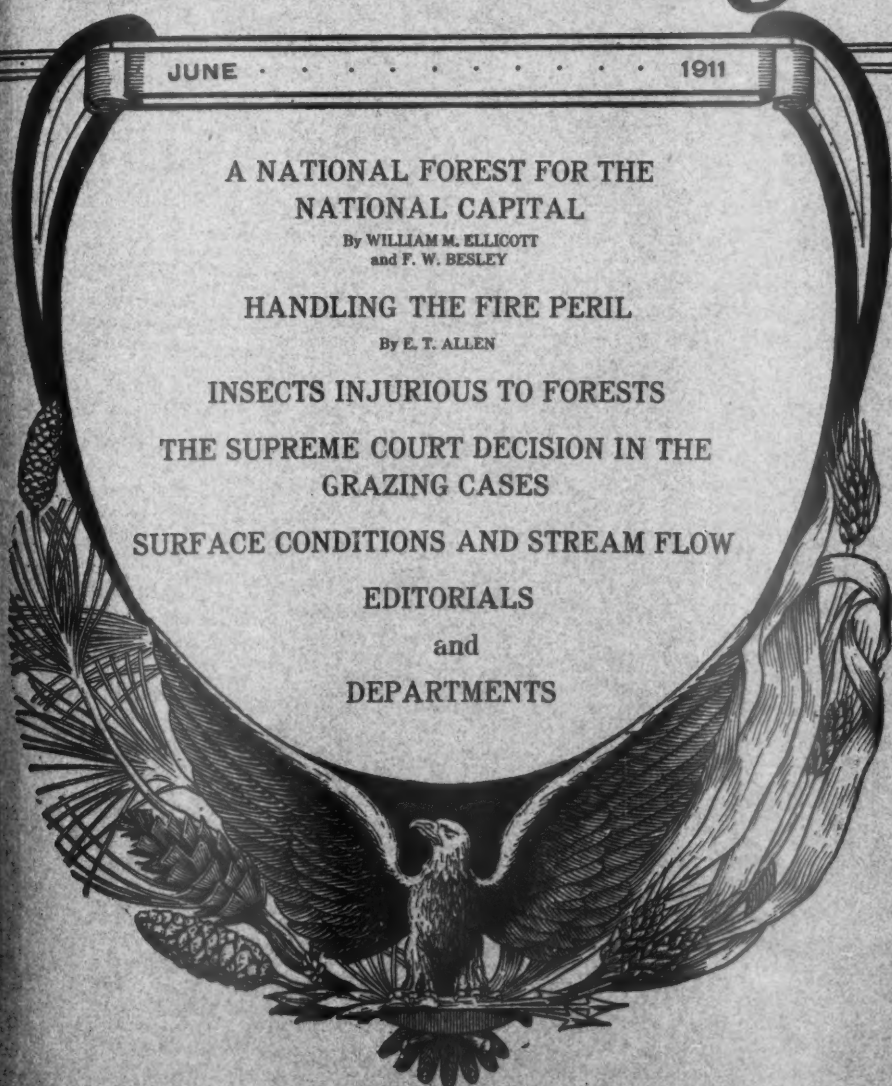
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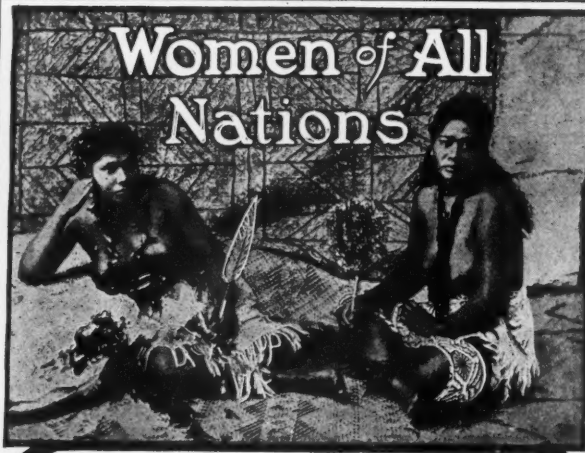
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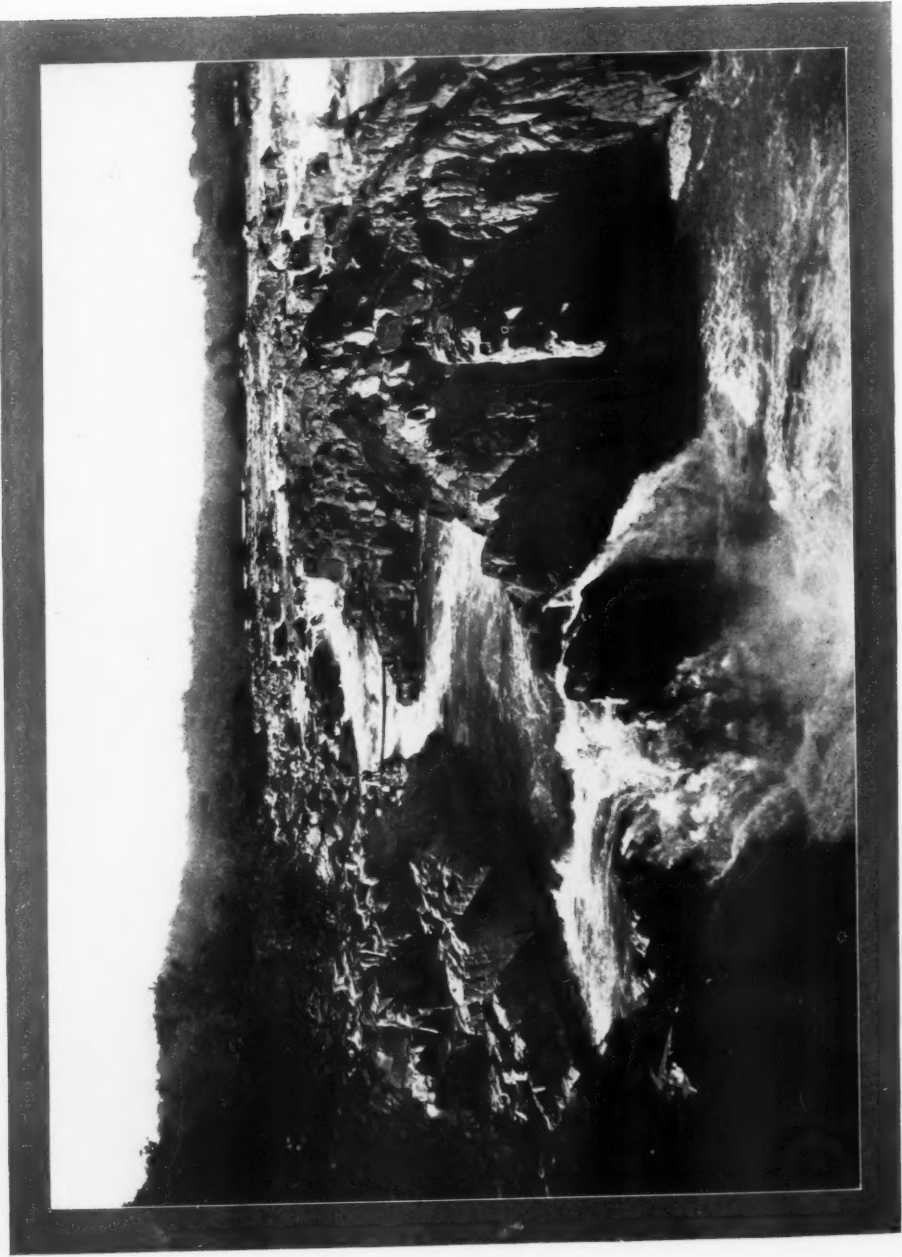
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*Treadwell Cleveland, Jr.*



A NATIONAL CAPITAL FOREST

GREAT FALLS OF THE POTOMAC—A NEGLECTED  
JEWEL OF WASHINGTON'S ENVIRONS

# American Forestry

VOL. XVII

JUNE, 1911

No. 6

## A NATIONAL CAPITAL FOREST

By WILLIAM M. ELLICOTT

THE object of this paper is to recommend the creation of a national forest for demonstration and experiment and as a setting for the United States capital. Such a forest would be a fitting background, worthy of the dignity of the nation's seat of government and would give continuity and variety to the impression gained from the magnificence of buildings, boulevards and monuments of the city proper.

Some of the western states are happy in having areas set aside as national forests and national parks, and national forests are now to be established in the East, in the northern and southern Appalachian Mountains. We look also to Biltmore, in North Carolina, as a great achievement, and should view it as an object lesson in practical application of the principles of forestry to private lands. All these examples, however, are unfortunate in one respect—their remoteness from the main traveled routes, rendering them inaccessible to the vast majority of our people, for whom they exist but as shadows, exerting the minimum of influence in their daily life.

The necessities of the present time are such as to demand a full and thorough demonstration of the possibilities of the management of forests and their rehabilitation.

The experience of European nations illustrates, first, the dangers arising from denudation and, second, the commercial value of reforestation when it is done under scientific management.

The use of forests by the people becomes a habit which inures to the benefit of the whole population, adding to its vigor and zest of life.

Agricultural expansion in America has left certain areas unconquered because of their unfitness for cultivation, and in these rests the hope of future generations. One of these tracts, though sadly mutilated, has remained to our day a vast forest useful for no other purpose. Providentially also, it exists in a place which above all others should recommend it for protection and improvement to the people of the United States. It forms the background of the national capital, beginning at the bounding line of the District of Columbia at Bladensburg and extending northeast nearly twenty miles until it crosses the Patuxent River, a tract of 41,000 acres, while separated from it by a narrow strip between Washington and Laurel, there is another body of 16,000 acres. Beyond the Patuxent it swings eastward touching the Severn and South rivers and reaching the outskirts of Annapolis, the seat of the United States Naval Academy, and thereby adds another area of 43,000 acres.

Another forest district of vital importance to the nation's capital, containing some grand scenery which, though separated from the main bodies by the breadth of Montgomery county should be included in the purchase, borders the banks of the Potomac River from the District line to a point beyond the Great Falls, an area of 10,000 acres. Conditions here are distressing in the extreme, as no effort has so far been made to care for it, and year by year injury to the landscape is done. Surely devotion to the public welfare should prompt Congress to protect this great possession.

The value of the lands in question is comparatively small, but as the pressure of population increases this will not continue, and it is not wise to defer provision for its purchase. Altogether these areas cover one hundred and ten thousand acres. The Forest Service should ascertain the merits of the various districts for forest purposes and study the replanting of certain parts, and a commission should plan for the maximum of beauty and utility, which are lost for want of skillful and intelligent handling.

Water courses should be improved and artificial lakes could be made as beautiful as natural ones, and the attraction of the woods may be enhanced by the erection of suitable buildings properly located. A structure of the character of a German schloss or a small chateau to serve the traveling public as an inn or automobile club would not be out of keeping.

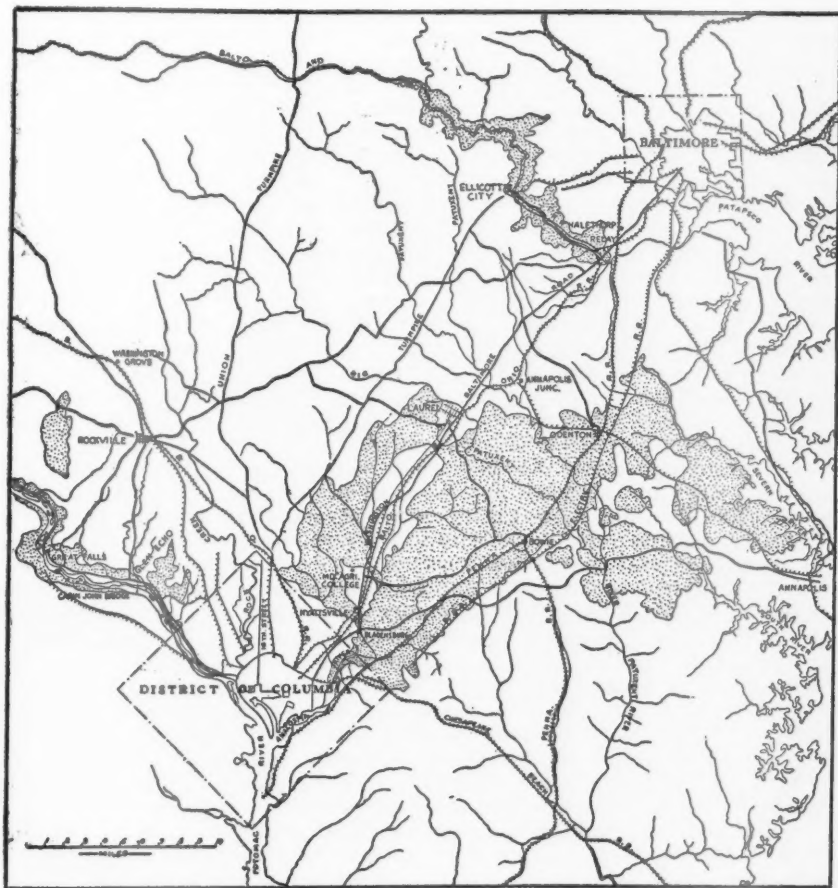
Here, then, at the gateway to the capital lies a splendid domain such as the kings of the earth from the earliest time have taken for themselves and jealously guarded as among their dearest possessions. We see it in the New Forest in England with its 90,000 acres—established by the Conqueror—in Fontainebleau also; and in that one which existed in the shadowy past within the present borders of the city of Paris, of which the Louvre retains the name of the king's hunting lodge of that day.

Many other forests might be mentioned, as, for instance, that proud possession of the city of Zürich, given to it by Charlemagne himself.

Looking, then, for a moment at the forest through the silver birches among the laurels, and into the hemlocks beyond—or turning about and gazing across the lake over the receding hills at sunset, you may, in spirit, visualize what you have seen with the eye of the flesh and thus discern what the people may do for themselves and why they should do it for their own well-being and for the benefit of generations to come.

At the southern apex of the territory indicated is the old town of Bladensburg and neighboring hamlets. Here are found historic specimens of colonial architecture—the Calvert mansion, the inn at which General Washington used to put up when he was planning the great city, and Parthenon Heights, a quaint old house of Revolutionary days. It is here that the two main branches of the Anacostia River meet, the one stream coming down from Tacoma Park, near the northern corner of the District of Columbia, and the other, or Northeastern Branch, emerging from the principal forest areas with which we have to do. The road leaving Bladensburg crosses the Anacostia bridge and arrives soon at the border of the forest and after traversing several miles of quite interesting country, the line of the Pennsylvania Railroad is reached. It then turns north and enters the forest again, passing through spruce, pine, oak, and poplar, all of which, under present ownership, is kept thinned out as it becomes of commercial value in the local market for timber, railroad ties, pulp or firewood.

Reference to the accompanying map which is made from detailed charts of the forest areas of the Maryland Forest Department will show that the District is approached by numerous electric and steam railways as well as by county and turnpike roads.



A NATIONAL CAPITAL FOREST LANDS MAP SHOWING IN THE DOTTED AREAS THE PROPOSED NATIONAL FOREST

On approaching the height of land between the Anacostia and the Patuxent watersheds, there are hills of considerable height. Thence one descends rapidly to the Patuxent River valley, across which the forest still continues, reaching out towards the Patapsco, whose twenty miles of lovely nature extend from the harbor of Baltimore to Relay, thence to Ellicott City, six miles, and continues beyond between Baltimore and Howard counties, all of which is designated as a part of the parking system of Baltimore.

To render the forest available for use as a pleasure ground it must be opened to access. Intersecting alleys should be planned concentrating, perhaps, at some quiet pool or pretty refuge, and the roads which traverse it should be improved and the system extended to connect by way of the Potomac, the Anacostia and Rock Creek with the parking system of the District of Columbia, and with that future pantheon of American greatness, the "Mall," which will one day rival the most splendid examples of formal landscape design of the old world.

The undertaking of such a scheme will not only be the glory of our beautiful capital, but it will offer to a dense urban population and to countless transient visitors every form of sylvan pleasure which the inheritance of past ages can suggest from periods when the joy of life and pleasure in beauty went hand in hand.

For these reasons the purchase of a large tract of forest land at a cost of from two to three million dollars by the United States government is advocated. Had another site been chosen for the capital it is likely that the problem of its surroundings would have been entirely different, because the existing conditions are unique, and the suggestion of a forest background might have been chimerical and impractical.

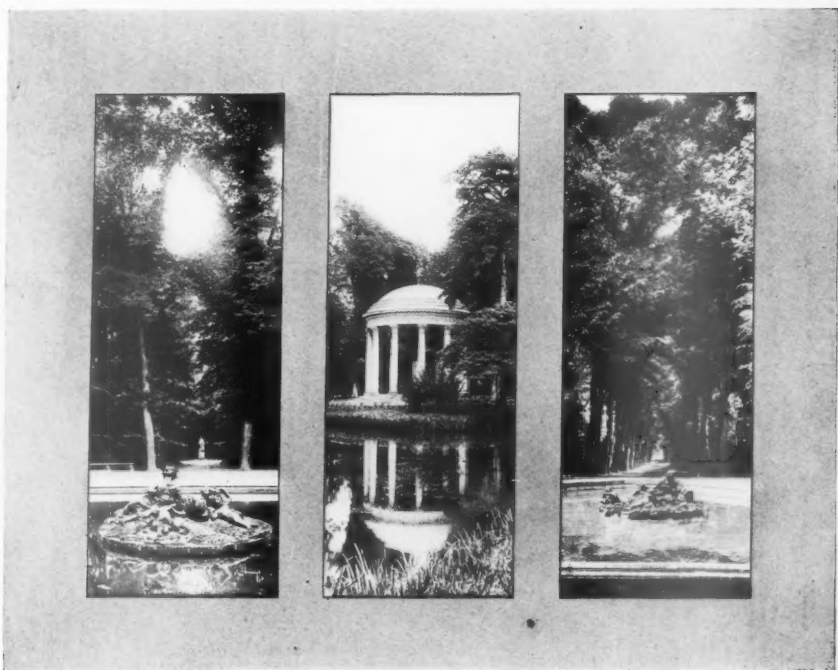
Fortunately, however, for the project, both as to its direct bearing upon the adornment of the capital and its value in assisting in the promotion of forest cultivation and protection whether private, state or national, all the circumstances illustrate the wisdom and even necessity of prompt provision for the need of the near future.

Its value for experimental and demonstration purposes can hardly be overestimated. The product of an average acre of such land planted in forest at a cost of eight dollars and cared for at an almost negligible annual expense, at the end of a period of forty years is about two hundred dollars, which represents a handsome profit from otherwise valueless property. Large tracts in private hands throughout the eastern states are available for this purpose only, and their almost universal neglect constitutes at once a great menace through their injurious influence upon climate and water supply and an immense financial loss, while to demonstrate the possibilities of this branch of agricultural industry and science should be a great advantage to the nation.

If the United States government desires to regard it simply as an object lesson it may look forward to a handsome revenue without contemplating such extensive cutting as to materially diminish its beauty and attraction.

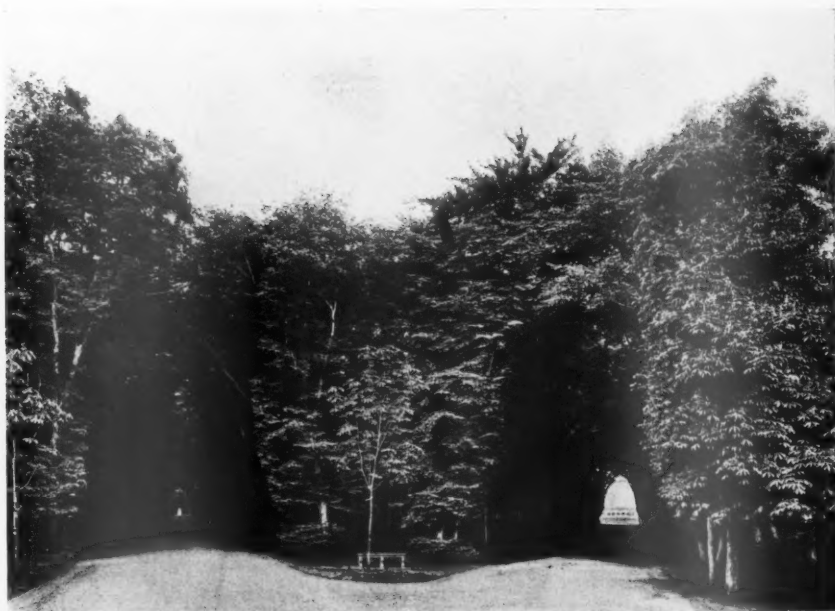
Nearly all the great forests of Europe pay large profits, and the example of some of our great railroads in reforesting tracts to produce railway ties, telegraph poles and other timber, shows that the time has come when the original forests must be replaced by artificial means. The plan here outlined has been widely approved by societies interested in the public welfare and by the press. For the sake of brevity an editorial of the New York Evening Post, which appeared also in the Nation, is quoted as follows:

"Probably the first impulse of nine persons out of ten, on reading the proposal that the government shall create a national forest of 100,000 acres immediately adjacent to Washington city, will be to say that it is nonsense.



*Courtesy of Art and Progress*

GLIMPSE OF THE PARK AT VERSAILLES



*Courtesy of Art and Progress*

A NATIONAL CAPITAL FOREST

CONVERGING ALLEYS IN A FRENCH PLEASURE FOREST



*Courtesy of Art and Progress*

IN THE FAMOUS FIFTY-MILE AVENUE OF  
NIKKO, JAPAN



*Courtesy of Art and Progress*

A NATIONAL CAPITAL FOREST

IN WOODWARD GROVE, A PART OF THE  
FOREST PARK OF MADISON, WISCONSIN



MIXED HARDWOOD FOREST,  
PRINCE GEORGES COUNTY,  
MARYLAND



COUNTRY ROADS IN THE PROPOSED  
WASHINGTON NATIONAL FOREST AREA



A NATIONAL CAPITAL FOREST

But it is anything but nonsense. \* \* \* That there is a considerable forest area in a primitive state in the region bordering on Washington must strike every one at all acquainted with that section. \* \* \* If the tract is all Mr. Ellicott thinks it is, there is probably no investment of a few million dollars that would be better worth while. To preserve in perpetuity a genuine national forest 150 square miles in extent, within a stone's throw of the national capital, would be an invaluable achievement."

## A REPORT ON THE WASHINGTON FOREST

By F. W. BESLEY

STATE FORESTER OF MARYLAND

(A report from surveys, maps and data in the Maryland Forestry Department.)

THE area proposed for a national forest represents some of the oldest settled lands of the country. Since its occupation 250 years ago many changes have taken place. A considerable portion of the land under cultivation prior to the Civil War has since grown up in forest, not alone because of the scarcity of labor necessary for its continued cultivation, but because much of it was found better suited to the growing of timber than for agricultural crops. These young forests of hardwood and pine coming as a second growth have attained considerable importance, and by proper management they can be moulded into forests of great value. There are still to be found in small tracts some of the virgin forests showing the magnificence of the original growth and further illustrating future forest possibilities. For the botanist and the dendrologist, this is one of the most interesting regions of the eastern United States. Here on the border of two great physiographical divisions, the Coastal Plain and the Piedmont Plateau, the flora of the North mixes with that of the South, and gives a variety of species difficult to find in any other area of equal size. As a natural arboretum, this region is unsurpassed. There are over sixty-five tree species alone, to say nothing of a large number of arborescent shrubs. Most of the valuable commercial species of the entire eastern United States are represented here. The great diversity of soils and forest types offers exceptional advantages as a demonstration field for applied forestry.

A forest survey of the Maryland counties, partly included in the proposed national forest, was made by the writer in 1907-1910 and furnishes the forest data upon which this report and the accompanying map is based. In establishing a national forest, such as is proposed, it is very desirable to include, as far as possible, lands that are now largely wooded. The large wooded areas, lying between Washington, Baltimore and Annapolis, afford a rare opportunity for carrying out such a plan. The area shown on the map, lying between Washington and the Patuxent River, to the west of the Baltimore and Ohio Railroad, covers approximately 16,000 acres, of which about 8,300 acres, or 50 per cent, is now wooded. For the purpose of the forest description, any given area is considered wooded where there is a tree growth on the land at least ten feet high and where the trees are close enough together to form a stand. The main body of forest lying east of the Baltimore

and Ohio Railroad, including spurs extending along South River and the Severn River, covers approximately 84,000 acres, of which 50,200 acres, or 60 per cent, is wooded. The portion south of the Patuxent River is more largely wooded than the rest, amounting to 70 per cent. The portion to the northeast is 50 per cent wooded. The forests differ in character and composition, dependent upon soil conditions, especially as to moisture content, and also dependent upon the extent of previous cutting. On the few high gravel ridges along the edge of the Piedmont Plateau, the characteristic species are rock, post and black oaks. The higher slopes generally throughout the area are covered with scarlet and Spanish oaks, and chestnut; while on the lower slopes are found hickory, white oak and yellow poplar, walnut and black gum as the predominating trees. Along the streams a great variety of species are found, notably the maple, sycamore, beech, ash, birch, elm, etc. The characteristic trees of the swamps are red gum, willow, pin oak and willow oak.

The forests of the region have been cut over rather closely so that they consist principally of young growth, with scattering trees of larger size. Since it is easier to develop a young forest into good form than it is to improve an old one, the present situation has decided advantages. Furthermore, a forest largely composed of young growth can be purchased at a much more reasonable price than one containing timber of merchantable size. The probable cost of these lands can only be approximated. The average for the woodlands, exclusive of timber, would probably not exceed \$20 per acre. The value of merchantable timber based on the average stand for the entire area is approximately \$6 per acre, giving an average of \$26 per acre for the land and timber. Some of the land can be purchased for much less than this, while some, if included, will cost more, depending upon location and the value of the timber thereon.

The proposed extension of the national forest along the Potomac River, above Washington, includes a section noted for its natural beauty. The steep hills on the Virginia side of the river are well wooded, almost all the way from the District line above the Great Falls. On the Maryland side of the river the slope is less abrupt and there is more cleared land. The area indicated on the map, including a large tract west of Rockville, which is very largely wooded, is approximately 10,000 acres, of which about 6,000 acres, or 60 per cent, is now wooded.

The combined areas available for forest reservation as indicated on the map comprise about 110,000 acres, of which practically 64,500 acres, or 58 per cent, is now wooded. By making the boundaries more irregular, or excluding tracts that are nearly all cleared land, the area might be reduced and the percentage of woodlands correspondingly increased. The presence of cleared lands within the forest boundaries would not be a disadvantage. The best of the farm land could be used as experimental farms in cooperation with the Department of Agriculture, while those less adapted for agriculture could be planted in forests. It is safe to say that 85,000 acres of the tracts mentioned are typical forest lands already in forest or suitable for reforestation. There are many foreign trees that have not been fully tried in this country under forest conditions. The rate of growth of most of our native species under the most favorable conditions as would result in planting have not been determined. The field for forest experimentation is a large and promising one which would find here the ideal conditions for its fulfillment.



*Photo from U. S. Forest Service*

ZURICH'S FOREST ESTABLISHMENT IN  
THE SIHLWALD

A NATIONAL CAPITAL FOREST



*Photo from U. S. Forest Service*  
 NATURAL REPRODUCTION AFTER THINNING  
 IN THE SIHLWALD OF ZURICH



A NATIONAL CAPITAL FOREST

*Photo from U. S. Forest Service*  
 TOURIST PATH IN TOWN FOREST, ADLISWIL,  
 ZURICH

## HANDLING THE FIRE PERIL

By E. T. ALLEN

FORESTER, WESTERN CONSERVATION AND FORESTRY ASSOCIATION

IN 1910, probably the worst fire year in American history—a year when no rain fell for months, when the winds were veritable hurricanes, when fires sprang up everywhere and were numbered not by hundreds but by thousands—the Western Forestry and Conservation Association and its constituent membership carried safely through the season fully 16,000,000 acres of forest, containing at least the stupendous amount of 300,000,000,000 feet of timber. They spent \$700,000 for patrol and fire fighting and extinguished over 5,580 fires. Of the vast area protected, barely half a million acres were burned over, including timber, second-growth and cut-over land. Not more than half of one per cent of all the private timber in Idaho, Washington and Oregon, the states which suffered heaviest from the 1910 fires, was damaged, and the actual loss will not exceed a quarter of one per cent.

True, this loss was serious, and there was destruction of villages and human lives, but this was only the greater evidence of the test to which the associations were subjected. It proves only too well the hazard which applied equally to the immense area saved and compared to which the loss was insignificant. Had it not been for the associations, the West would have suffered one of the greatest calamities the world has seen.

During the legislative season following, the Association made an active campaign for more adequate state protective work, especially in Oregon and Washington, and due chiefly to its efforts these states passed completely new forest codes and increased their annual appropriation from \$23,000 to \$68,000.

The Association receives continual requests for information about organization and methods of cooperative work from all parts of the United States and Canada, and many new associations have resulted. It is mentioned more frequently in press and periodicals than any forest protective agency in the United States except the federal forest service.

All this means a record of achievement. It means that the timber owners of the Pacific Northwest are held up as protectors of the nation's resources instead of destroyers, as worthy of public commendation rather than suspicion. It means conceding an honestly earned right to a voice in laws and policy of conservation. It means that the stability of investments in western timber is being impressed on capital. Consequently it must mean sound principles, effective methods, and expenditures both liberal and well directed. What are, then, the objects and methods of the cooperative work which has given the Pacific Northwest this distinction?

The first principle of the movement is to preserve the forests. Not to tell some one else how, but to do it. There is a difference. Propaganda associations, like newspaper articles and speeches, are good in their way, but it takes real money and work to put out fires. The Pacific coast associations get the money and spend it. If two cents an acre suffices, well and good; if it takes

fifteen cents, why fifteen is spent. Probably this is the single greatest difference from the popular two-or-three-dollar-annual-due association and from the watch-dogged congressional system of guarding the public domain.

The second cardinal principle is community of interest. The associations do only those things by which the private forest owner, the people, the state and the government unquestionably benefit equally. Consequently they have no criticism or suspicion to fear and, what is far more important, are always in position to enlist support or join forces anywhere without embarrassing themselves or any one else. During all the recent controversies between factions regarding federal conservation policies, states rights and the like, the association meetings and affairs have been participated in with the utmost harmony and on equal footing by lumbermen, state officials, forest service officers and conservation enthusiasts. Whatever each may think of existing conditions or proposed changes in them, his work with the association is to make the very best of them as they are, with his own hands or money, for the common public good. Without denying that the question of for whom our resources are to be conserved is important, the association concerns itself not at all with this question, but proceeds to conserve, actually and practically, dealing with the resources themselves instead of views concerning them, to the end that they may not be destroyed before disputants agree as to who shall eventually enjoy them.

Related closely to community interest is the cooperative principle which has been applied, not only in theory, but to its utmost lengths in finance, counsel and objects. In the actual fighting of fires and publication of educational material, as well as in interchange of experience and suggestions, the forest owners work with each other, with the public and with state and government. Every effort is made to perfect a system under which all agencies for forest preservation may work not only without friction and with the strength of numbers, but with the least unnecessary expense of duplicated effort. Cooperation is a word often employed but seldom really applied. With us it means more than mere voluntary give or take, where each secures the other's help with the least return and both are mutually suspicious and guarded. We pool the work so each *has* to contribute his very best effort, or suffer himself in consequence.

Finally, publicity has been sought and welcomed, and in two ways. There has been an unremitting educational campaign to convert public and lumberman alike to necessity and methods of forest preservation. Furthermore, the actual work of the associations has been laid bare for scrutiny in every detail. Meetings and reports are public. There can be no charge that the influence of the organization is used for any hidden or improper purpose.

So much for general principles, now as to definite objects. It is the belief of the several forest owners' associations of the Pacific Northwest, affiliated in the Western Forestry and Conservation Association, that, while conservative management in all ways should be adopted as fast as conditions permit, the underlying foundation is safety from fire. They believe that to secure it there must be extensive education, strict enforcement of good fire laws, vigilant trained patrol to suppress before they spread the fires which start in spite of all preventive effort, and means of marshaling quickly an efficient force to fight the very few large fires which will occur, notwithstanding the foregoing precautions, just as a Baltimore or San Francisco burns.

They attempt to provide as much of such a system as private effort can provide, and to secure provision of the rest by the public. They believe that division of responsibility should be something like this: The forest owner should do his full share financially and is best equipped through local and

practical knowledge to patrol and fight fire. The state should assist him, for life, property and forests are community resources, and it is in the strongest position to do educational and law-enforcing work. But since to bring about such an ideal division in itself requires much education, the associations now have to assume much of this burden also.

These policies, and the methods by which they are put into practical application have developed from comparatively small beginnings. The first step was installation of patrol systems by individual owners. This led to cooperative patrols to reduce the expense of duplication. This, again, quickly proved the far greater efficiency of systematic organization, wholly aside from the question of cost, and also greater influence over careless public and lumbermen. Varying in extent of territory from a single watershed, as in Idaho, to half a state, as in Washington, patrols were consolidated into formal associations which assess each member at an equal acreage rate and transact the entire business of employing, supervising and supplying the fire forces, having them authorized by the state, building trails and telephone lines, etc. The cost is modified to suit the season by adding or laying off men, and danger points are given special attention, much better than through individual effort. Especially advantageous is the covering of gaps between holdings.

Cooperation with state and government forces is placed on a systematic basis. The territory of each association is divided into districts, each having its local patrol, and these are grouped by districts under inspectors. A chief fire warden controls the whole system. Every officer, in addition to straight patrol and fire work, is held responsible for keeping settlers, campers and loggers advised of the fire laws, dealing with violators, looking after dangerous slashings, etc. They are as severe upon lumbermen as upon any one else and pay no attention to ownership. The same work is done upon land belonging to non-members as upon that of members. This principle of equal treatment is a cardinal one throughout. The member owning but 40 acres has the same vote in the affairs of the association as the member with 100,000 acres.

The cost of this protection varies from  $1\frac{1}{2}$  cents an acre annually to as high as 15 cents expended last year by some of the hardest-hit Idaho associations. In Idaho, the state is a member of the associations, paying its pro rata on its timbered grant lands. In Washington it helps defray the expenses under agreement by the state forester.

One of the early lessons learned was that results in forest protection are most truly measured not by the fires put out, but by the absence of fires to extinguish. Patrolmen are selected largely for their ability to command public respect and enlist public interest in the first problem. Similarly each association gives its work and results the greatest possible publicity, which is an easy matter, for press and public accept the work as for community good and the information obtained as reliable.

It soon became apparent that the same advantage secured by local cooperation would apply to the working together in other than local matters by the several associations. Consequently the Western Forestry and Conservation Association was formed to afford central facilities for all forest protective agencies in the five states of Montana, Idaho, Washington, Oregon and California. It is a sort of grand lodge, without individual membership except that the chief state and federal forest officers are prominent and valued members. All associations devoted to forest conservation are eligible, including the public conservation associations having no connection with the timber industry, and have equal vote.

A forester is employed, with facilities for investigative and educational work. One of the chief duties of his office is to act as a clearing house for all

the affiliated organizations, not only for exchanging experience and suggestions, but also for issuing publicity matter, dealing with outside agencies and generally representing the movement in all ways. Being recognized as a disinterested authority, the central association is invited into council on subjects of forest protection and legislation all over the United States, by public, private and official agencies of all kinds. It furnishes material for the reports of state conservation and forestry commissions, prepares and advises upon forest legislation, supplies copy for educational literature and fire warnings, assists public speakers in the preparation of papers dealing with forestry subjects, and is frequently called upon to address conventions of all kinds.

One particularly important function of the central association is to collect and distribute frequent and reliable information concerning fire conditions, steps to meet them evolved by the several agencies, and the results in protection and losses. It affords the only means of combining state, federal and private reports. Two meetings a year are held, at which representatives of each of these agencies from the five states confer and to which are invited any others who may be concerned. For example, last December's meeting was made the occasion to discuss cooperation with officials of the transcontinental railroads.

All of this costs money. To insure against any possible charge of selfish influence by those who supply it, no individual contributions or dues are permitted. Once a year the affiliated organizations vote a pro rata assessment to cover the following year's estimated expenses, and in its use the forester is governed only by a semi-annual meeting of five trustees, one from each state, elected at an annual meeting in which every local association has equal voice regardless of the amount of its contributory assessment.

The history and future of this movement are of much significance. The five states involved contain half the standing timber in the United States today. The protection of this national resource is of the highest importance. But quite as important is the fact that here, where such forests can be produced more rapidly than elsewhere, is the great field of future American forestry—the nation's woodlot, as it were. And so far from requiring compulsion in the public's behalf, the private owners who hold these great forest areas in trust are doing their part to safeguard the future consumer more liberally than state or Congress, and by doing so today give the best earnest of their part in the future.



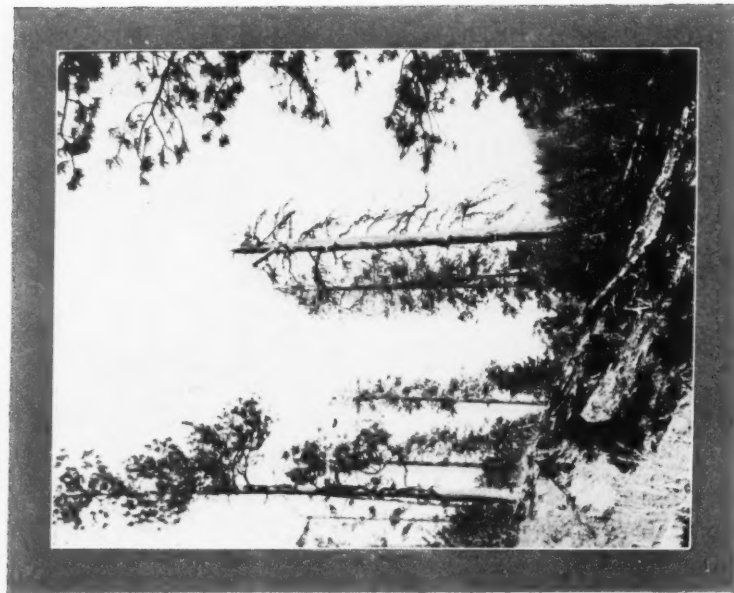


SPRUCE TIMBER KILLED BY THE SOUTH-  
ERN PINE BEETLE IN THE MOUNTAINS  
OF NORTH CAROLINA



*Photo by A. D. Hopkins*

INSECT CONTROL DEMONSTRATION CAMP



*Photo by A. D. Hopkins*

TREES KILLED BY BARK BEETLES

INSECTS INJURIOUS TO FORESTS

## INSECTS INJURIOUS TO FOREST TREES

THE true relation of forest insects to forest conservation has not generally been fully recognized, yet the annual loss of standing timber that is killed or reduced in value by injurious insects is estimated by the Bureau of Entomology of the United States Department of Agriculture, through its expert in charge of forest insect investigations, Dr. A. D. Hopkins, at \$62,500,000. If this estimate is approximately correct it will at once be seen that insect control assumes an importance beside fire control in any scheme of forest conservation.

Fortunately, while this danger to our forest trees has been given so little popular attention, no subject relating to our forests has received more thorough and exact scientific investigation. The Bureau of Entomology, starting ten years ago with very little knowledge of the conditions, has accumulated in that period a notably full and exact knowledge of the life-history and habits of the principal species of insects that are destructive to our forest trees, and not only that but also, based upon it, a clear conception of means and methods of control, so that Dr. Hopkins does not hesitate to say with absolute certainty that these species can be controlled so as to be comparatively harmless. This conclusion is based not upon laboratory work and theory, but upon results actually accomplished on so large a scale as to afford positive proof of the fact. The results of the Bureau's work in this field have been made accessible in a series of circulars of the Bureau of Entomology, prepared by Dr. Hopkins,\* and in the bulletins from which they are derived.

In this connection it is worth while to note that an important work is now being done in the Northwest through cooperation of the United States Forest Service, the states, and private owners, under the direction of United States Bureau of Entomology experts. This is on the largest scale yet undertaken. It is the beginning of a system of field stations to be established by the Bureau of Entomology in every forest district. By means of these stations the expert knowledge of the bureau can be made available and forest rangers, state forest officers, and the foresters and cruisers of private owners can be trained to put into practice the principles of scientific insect control. For it must always be remembered that successful control must be based upon complete knowledge of the insects and must be rightly directed. It would not be wise for laymen to undertake this work even after a study of the publications summarized in this article, without expert direction. And here is where the value of the Bureau of Entomology comes in, for it places at the command of land owners, at insignificant cost, expert scientific knowledge of the highest type.

### INSECTS WHICH KILL FOREST TREES

Of all classes of insects which attack our forest trees and their products, the bark beetles of the species *Dendroctonus* are the most serious menace to our forests, and fortunately are among the best known and understood. It is

\*Circular No. 125. Insects Which Kill Forest Trees.

Circular No. 126. Insects Injurious to the Wood of Living Trees.

Circular No. 127. Insect Injuries to the Wood of Dying and Dead Trees.

Circular No. 128. Insect Injuries to Forest Products.

Circular No. 129. Insects in their Relation to the Reduction of Future Supplies of Timber, and General Principles of Control.

These circulars are all revised extracts from Bulletin No. 58, Part V., Bureau of Entomology, United States Department of Agriculture.

with this species that the first of these circulars deals. The principal species in extent of their depredations are the southern pine beetle, eastern spruce beetle, Engelmann spruce beetle, Black Hills beetle, mountain pine and western pine beetles, Douglas fir beetle, and hickory bark beetle.

The southern pine beetle is one of the most dangerous insect enemies of southern pines. The eastern spruce beetles ravaged the spruce forests of New York, New England and southeastern Canada prior to 1900. The Engelmann spruce beetle, with habits similar to the last named species, has frequently done serious damage in Engelmann spruce forests in the Rocky Mountain region. The Black Hills beetle is one of the most destructive of the forest beetles, and during ten years is estimated to have destroyed more than a million feet of timber in the Black Hills National Forest. It is distributed throughout the middle and southern Rocky Mountain regions. The mountain pine and western pine beetles attack the sugar, silver, western, yellow and lodgepole pines of the region north of Colorado and Utah, westward to the Cascades, and southward through the Sierra Nevadas. The Douglas fir beetle occurs wherever that tree does. The hickory bark beetle has caused heavy loss in the last ten years from Wisconsin to Vermont and southward to central Georgia.

The bark beetles which kill trees attack the bark on the trunk and destroy the life of the tree by extending their burrows, or galleries, in all directions through the inner, living bark. The broods of young grubs or larvæ develop within the inner bark on which they feed. Those of some species develop to the adult stage within the inner bark and are exposed when the bark is removed, while those of other species transform to the adult in the outer corky bark, and the larvæ are not exposed when the bark is removed. Some species have two or more generations in a season, or annually, while others have but one; and in a few species it requires two years for a single generation to develop. From this knowledge of life-history and habits of beetles of this class are derived general directions for their control, which are embodied in the following rules: (a) Give prompt attention to the first evidence of a destructive outbreak as indicated by an abnormal percentage of yellow or red topped dying trees and especially when such trees occur in groups of ten or more, or cover large areas; (b) secure authentic determination of the particular species of insect responsible for the trouble; and (c) take prompt action towards its control according to specific expert advice. Some of the methods to be adopted to meet the requirements of local conditions are as follows:

- (1) Utilize the infested timber and burn the slabs during periods in which the broods of destructive beetles are in immature stages, or before the developed broods emerge from the bark.

- (2) Fell the infested trees and remove bark from the main trunk and burn the bark, if necessary.

- (3) Remove the infested bark from the standing timber and burn the bark when necessary.

- (4) Immerse the unbarked logs in ponds, lakes or streams where the bark will remained soaked long enough to kill the insects.

- (5) Remove the unbarked logs or products to a locality where there are no trees liable to attack within a radius of twenty miles or more.

The circular further suggests an insect control policy by which groups of dying trees can receive as prompt attention as that required for the prevention or control of forest fires. In state and national forests those in charge should have equipment and instructions for locating beetle-infested trees and for taking necessary action. In private forests the owners should be led to under-

stand that their personal interest demands that proper action be taken in cooperation with other interests, according to reliable advice.

These general suggestions are based upon actual demonstrations of successful control, some of which may be cited by way of illustration. An alarming outbreak of the eastern spruce beetle in northeastern Maine in 1900 and 1901 was controlled by the concentration of regular logging operations in the areas of infested timber, placing the logs in lakes and streams and driving them to the mills on the Androscoggin River. Thus, with little or no additional expense there was a saving to one firm, according to its estimate, of more than one hundred thousand dollars.

Complete control of the hickory bark beetle, threatening the destruction of hickory trees on Belle Isle Park at Detroit, Michigan, in 1903, was effected by felling and removing the infested trees, converting them into merchantable products, all without cost to the park commission.

An extensive outbreak of the Black Hills beetle in the vicinity of Colorado Springs in 1905 and 1906 was brought under control through the efforts of the private owners and of forest officials in the adjoining national forest. It was accomplished by cutting and barking about one thousand beetle-infested and beetle-killed pine trees. The cost of the operation was largely, if not entirely, covered by the utilized felled timber, although there was considerable unnecessary expense involved through the felling and barking of trees from which the beetles had emerged and from the unnecessary burning of the bark and crop.

Another striking example of what is possible in the way of controlling this most destructive enemy of the pine timber of the central Rocky Mountain region, was shown on a large private estate and the adjoining Pike National Forest in Colorado. In the spring of 1907 a ranger of the Forest Service, under instructions from the Bureau of Entomology, examined the timber on this estate and found that the Black Hills beetle had been making depredations for the past ten years or more, resulting in the death of the choicest timber to the extent of more than 800,000 board feet. At the time of examination about 65,000 board feet was infested. The owner was notified of the conditions by the Bureau of Entomology, but no action was taken. Another examination in the autumn of the same year showed that the infestation had increased fourfold. This led to the prompt adoption of the recommendations and by May of the following spring, 1908, a small number of trees on the national forest was cut and barked to kill the insects in the inner bark and one thousand trees on the private estate were felled, the logs converted into lumber and the slabs burned, which accomplished the desired purpose of destroying the broods of beetle. The owner realized a sufficient revenue from the timber to cover the expense and leave a net profit of over \$1,200. Examination of the area in the fall of 1908 showed that this effort to control the beetle was a complete success. Thus the average death rate of about 100,000 feet of timber annually for ten years or more was reduced to a minimum at a net profit on the cost.

In 1909 a threatening outbreak of mountain pine beetles in the Snowy Mountains of Montana adjacent to and within the Jefferson National Forest, involved more than 1,500 infested and dying trees. Thirteen hundred and fifty-five trees were cut and barked to kill the broods of beetles. Four hundred and twenty-two trees were cut at private expense, and seven hundred and eighty-three at the expense of the Forest Service and the remainder by local owners. The average cost for felling and removing the bark from the infected portion of the trunk was thirty cents per tree. Careful examination in December, 1909, of the area showed that while some fifty-six trees had been

attacked by the mountain pine beetle the broods were being destroyed by woodpeckers and other natural enemies, and that therefore the effort to control the beetle depredations were a success. In 1910 no timber died.

These examples have shown that outbreaks of beetles in the forests can be controlled at moderate expense and that it is perfectly practicable for the best methods to be applied by private owners.

#### INSECT INJURIES TO THE WOOD OF LIVING TREES

A certain class of insects attack the wood and bark of living timber and while they do not contribute materially to the death of trees, or give much external evidence of their presence, they produce wounds in the bark and worm-hole and pin-hole defects in the wood which result in a considerable depreciation of commercial value. These defects are not detected until the trees have been felled and the logs converted into lumber. Thus the expense of handling and manufacture is added to the loss from defective material. Among insects of this class is the oak timber worm, which enters the wood of the trunks of the living trees through wounds in the bark and at the base of broken or dead branches and extends its burrows in all directions through the solid hard wood.

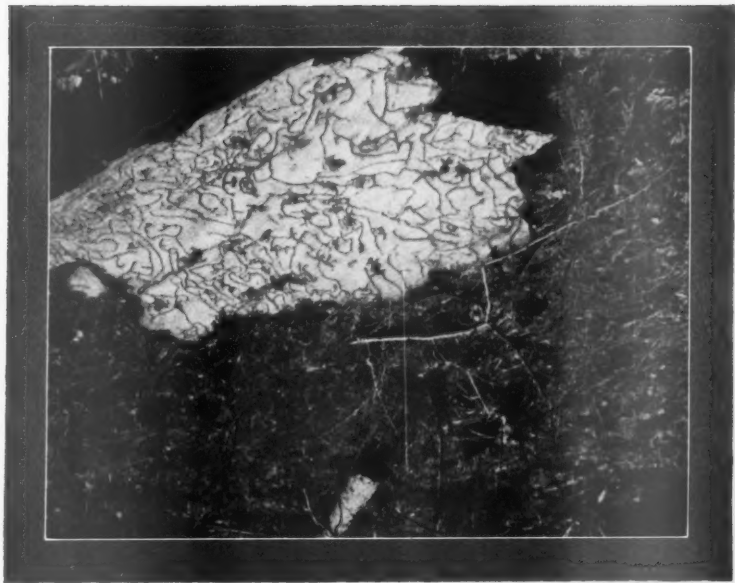
Another is the chestnut timber worm, which damages the chestnut in the same manner throughout its range. It is estimated that the reduction in value of the average lumber product at any given time is not far from thirty per cent. This insect also attacks oaks, and especially the red oak.

Carpenter worms are another enemy of the oak, making holes through the hard wood of the best part of the trunk, sometimes one and five-tenths inches in diameter by seventy-five hundredths of an inch. Other insects of this class noted by Dr. Hopkins are the ambrosia beetles, to which is due one of the commonest defects in white oak, rock oak, beech, whitewood or yellow poplar, elm, etc., known to the lumber trade as "grease spots," "patch worm" and "black holes"; the locust borer, turpentine beetles and turpentine borers, which are the cause of what is known as basal wounds, or basal fire wounds, in various species of pine: the white pine weevil, which is responsible for the abnormal development of white pine trees as a result of successive attacks on the terminals of saplings and young trees. This list is not complete, but includes some of the most serious enemies of the living forest trees.

Insects of this class, which cause defects in the wood of living timber, can best be controlled by (1) The utilization of all defective and infested timber that will pay expenses for manufacture into merchantable products: (2) the burning of infested timber and waste material not available for use, including dead and fallen timber to remove the breeding of insects like the oak timber worm and the chestnut timber worm, which go from the dead to the living timber; (3) the prevention of wounds of any kind in the bark of living trees; (4) the prevention of future losses by the practice of improved forestry methods to eliminate conditions favorable for injuries and contribute to a perpetual supply of vigorous, healthy timber to be utilized before it passes the stage of profitable increment.

#### INSECT INJURIES TO THE WOOD OF DYING AND DEAD TREES

Among insects, which by extending their burrows through sound sapwood and heartwood in dying and dead trees contribute to the deterioration and decay of a commodity which otherwise would be available commercially during periods of from one to twenty years or more after the death of the trees, are the sawyers, ambrosia beetles and pin-hole borers in cypress, all of which do extensive injury to the wood of coniferous trees; and the round-headed borers, timber worms and ambrosia beetles which similarly injure hardwood trees.



*Photo by A. D. Hopkins*  
 INSIDE OF BARK WORKED BY SOUTHERN  
 PINE BEETLE



INSECTS INJURIOUS TO FORESTS

ENGELMANN SPRUCE KILLED BY BEETLE  
 ABOUT 1853-6. PIKE NATIONAL FOREST



ENGELMANN SPRUCE KILLED BY FIRE  
AND THE ENGELMANN SPRUCE BEETLE  
IN THE LINCOLN NATIONAL FOREST



ENGELMANN SPRUCE KILLED BY THE  
BEETLE AND SWEEP BY FIRE IN PIKE  
NATIONAL FOREST

INSECTS INJURIOUS TO FORESTS

This injury is best prevented by prompt utilization of timber within a few months after it is dead or found to be past recovery; by removing the bark from the merchantable portion of the trunk within a few weeks after the trees are dead; by felling the trees and placing the unbarked logs in water; or by the adoption of a system of forest management which will provide for the prompt utilization of all trees dying from any cause.

#### INSECT INJURIES TO FOREST PRODUCTS

Damage is caused by various species of insects which are attracted by the varying conditions prevailing at different stages during the process of utilizing the forest resources from the time the trees are felled until the logs are converted into the crude and finished product, and until the latter reaches the final consumer or until after it is placed in the finished article or structure. As a result additional drains are made upon the timber to meet the demands for higher grades of lumber and for other supplies to replace those injured or destroyed. Dr. Hopkins states that from his personal investigations of this subject it is evident that the damage to forest products of various kinds from this cause is far more extensive than is generally realized. This loss differs from that resulting from insect damage to standing timber in that it represents more directly a loss of money invested in material and labor.

Injury to crude products, such as round timber with the bark on, poles, posts, mine props, saw-logs, etc., is caused by the same class of insects. The damage is especially severe when material is handled in such a manner as to offer favorable conditions for attack, as when the logs are left in the woods on skidways or in mill yards for a month or more after they have been cut from the living tree. Round-headed borers, timber worms and ambrosia beetles are all serious enemies of timber under such conditions.

Ambrosia beetles and other wood borers also attack freshly sawed hardwood placed in close piles during warm, damp weather during the period from June to September, and wood borers injure lumber and square timbers of both soft and hardwoods with the bark left on the edges, the borers hatching from eggs deposited in the bark before or after the lumber is sawed. Seasoned products in yards and storehouses suffer from the powder-post beetle, and old hemlock and oak tan bark is often so badly damaged by various insects which infest dead and dry bark that in some tan yards as much as 50 to 75 per cent of the bark that is over three years old is destroyed. The greatest loss of finished hardwood products such as handle, wagon, carriage and machinery stock is caused by powder-post beetles, and these, together with white ash or other wood-boring insects, follow the product into its finished state in implements, machinery, wagons, furniture and inside finish.

The control and prevention of such injuries as these offer less difficulties than that in many other branches of the general subject of forest insect control. In most cases the principle of prevention is the only one to be considered, since the damage is done soon after the insects enter the wood so the wood cannot be repaired by destroying the enemy. A great deal depends upon the proper degree of moisture and the period of danger varies with the kind of timber and the time of year it is felled. This applies to crude products, and, in a measure, to manufactured seasoned products. The general principles of control are on the same lines as those indicated in the other sections, and may be summed up in the general statement of prompt utilization and care in the conditions of storage. In utilized products material may also be treated with preservative.

## INSECTS IN THEIR RELATION TO FUTURE SUPPLY OF TIMBER AND GENERAL PRINCIPLES OF CONTROL

In the final circular of the series Dr. Hopkins states that investigations conducted by him and his assistants in all sections of the country during the past ten years indicate to them that the average percentage of loss in merchantable timber in the forests of the country to be charged to the insects is infinitely greater than most people realize. The author's estimates for a ten-year period have already been given.

Insect-killed timber makes, as is well known, better fuel for forest fires and fire contributes to the multiplication of insects which depredate on the bark and wood of dying and dead trees, so that in forested areas where fires are frequent, the damage to the wood of such trees is more severe, and fewer injured trees recover on account of the abundance of secondary bark beetle enemies which do not as a rule attack and kill living timber. Sometimes, when the infested areas are swept by fire, the broods of insects are destroyed and therefore complete fire control may easily contribute to more extended depredations by insects on living timber, thus increasing rather than diminishing the need for insect control. The setting of fires, however, or permitting them to burn for the purpose of combatting insects, should never be undertaken or permitted. Insect-killed timber could often be profitably utilized were it not for the secondary attacks of wood-boring insects and the destruction of insect-killed timber by forest fires. Injury by insects also often opens the way for fungi, although certain species and groups of both insects and fungi are trees.

It is admittedly difficult to estimate losses in terms of board feet, or dollars, there are so many contributing factors; but those estimates that are made in these circulars are the best that can be presented on available evidence. On this basis the author estimates the loss of standing timber killed or damaged by insects at an equivalent of more than ten per cent of the quantity and stumpage value of the total stand of merchantable timber in the United States at any given time. Considering this in its various relations to the nation's wealth and welfare and its effect on land values, it is difficult to estimate the loss chargeable to insects. Considered from the standpoint of loss in cash revenue, it means an annual loss in timber and its products of more than one hundred million dollars.

## PREVENTION AND CONTROL

It is, as a rule, useless to attempt to exterminate. The insect forces must be weakened 75 per cent or more to have the control effective, and this can be done by proper management. The author lays great stress upon forest management, but urges that any adjustment or modification in management or business methods should be based on expert technical knowledge of the species, habits, life-history and natural enemies of the insects involved, supplemented by expert knowledge of principles of technical and applied forestry, and by practical knowledge and experience as to local conditions.

The value of natural checks and factors of control of injurious insects without which such control would be impossible is dwelt upon. These natural factors consist of parasitic and predatory insects, diseases of insects, birds and climatic conditions, and all of them play an important part which can be more or less controlled by man in accomplishing the results. Finally he urges the prompt utilization of all insect-infested timber, so that losses may be limited as much as possible; especially as by so doing we can contribute more, perhaps, than in any other way to the reduction of the insects to or below their normal numbers and thus provide against serious injury in the future.

In reading the circulars upon which this article is based it must be borne in mind that they represent a body of knowledge which is still rapidly progressing. Some later facts are indeed mentioned in this article. The principles embodied in them, however, are well established, and it is the practice under those principles that is being perfected. Nor are these publications intended to be complete lists of the insects injurious to our forests. They include only those types that are of most importance and of which the Bureau of Entomology has sufficiently complete data to know how to deal with them.



## BAMBOO PULP AS THE PAPER MATERIAL OF THE FUTURE

By HARRY VINCENT

**W**HAT bamboo pulp is the one material that is likely to come to the front as a main source of paper stock supply, is the opinion of the *World's Paper Trade Review* of London (February 24, 1911). The difficulty heretofore has been in the bleaching, as the coloring matter could not be eliminated except by the expensive caustic soda process. This has now been obviated. The great advantage that bamboo has over other pulp material is in the growing. A piece of land once established in bamboo can be cut over annually for an indefinite period, as given a favorably watered situation, and preferably a gravelly soil, the bamboo in the tropics grows to an altitude of thirty feet or more yearly. As it requires but a three-year period to establish a field, it is perfectly plain that neither wood nor any other material can compete with it. As the United States has control over large territories in Porto Rico and the Panama Zone most suitable for bamboo cultivation (which is extremely simple) there should be no difficulty in getting a permanent future supply up to millions of tons a year.

The advantages of bamboo as a pulp maker are: (1) It has a good, strong vegetable fiber; (2) it is in general easily accessible for water transport; (3) it is cheap and easily collected; (4) it is available in large quantities and abundant within a given area; (5) it is available for a regular and constant

supply, and not subject to violent fluctuations either in quality or price; (6) it admits of simple and ready treatment, mechanical, chemical or both, for easy and inexpensive conversion into bleached pulp; (7) land established in bamboo, which will take three years from first planting to reach a height of thirty to forty feet, can then be reaped annually for an indefinite period.

Ordinary thick-walled bamboo, which, when given suitable soil and climate, grows with amazing rapidity and yields annually at least forty tons to the acre, contains fifty per cent of a very strong, yet fine and flexible, fibre, easily digested by the ordinary bi-sulphite process, and by a new method simply and inexpensively bleached, yielding when properly treated an excellent pulp, felting readily, and producing a paper, pliant, resistant and opaque, of enduring color, thicker than other paper of the same weight, and forming one of the very finest of materials for writing and printing, and of exceptional value for engraving.

The oldest bamboo is thoroughly and completely digested, knots and all, by the ordinary bi-sulphite process; but care must be taken in the cooking, as there is no reason to suppose that all bamboos are alike. Pine spruce, and poplar are treated quite differently in cooking, and nearly every factory has its own formula, and different strengths and temperatures are used. Direct steam should never be used with bamboo, but always steam coils with not more than forty pounds pressure until the last two hours, after first liberating the gases derived from bamboo which are different from those of wood. The mechanical portion which is absolutely essential to this process is a preparation of the bamboo for cooking as well as for bleaching. After being selected and assorted the bamboo has to be crushed in exactly the same manner as sugar cane, when it will appear after removal of the sap somewhat similar to mogass, almost pulverized and a slightly damp, spongy mass. In this form the bamboo is extremely permeable by the cooking solution, which can be used comparatively weak and without any necessity for a high pressure of steam. In all cases a solution to be used with bamboo should be as nearly neutral as possible. It may be slightly alkaline or slightly acid, but excess in either direction will waste a large amount of the fine fibres, and acts adversely on the chemical constituents of bamboo. These fine fibres are, according to Wildridge and Ekman, of great value in forming a close, opaque sheet of paper. They represent about a third of the cellulose, and unless the necessary precautions are adopted, they will be lost in the strainers and washers. So, obviously no part of the preparatory treatment can be carried out away from the place of growth of the bamboo.

The bleaching process is entirely new and differs from any other used for making pulps. It consists in an intermediate process the object of which is to prepare the pulp for bleaching, by steeping the bamboo after it has been cooked for a few hours in a solution made from electrolysed sea-water, salt, and diluted sulphuric acid, then after drawing off the solution (which can be used over and over again), giving the pulp a further bath in a very weak alkali and thoroughly washing it, when the whole coloring matter comes away, and a clean, fine and strong, light-colored pulp is left, which is now more easily bleached than any other pulp now in use. No other ingredients are necessary than those specified, which are of the cheapest possible description, and only a light electric current is required. The whole expense of the intermediate process will not add, including the bleaching, more than \$4 per ton to the cost of the pulp. Both the process and the apparatus for producing the solution (which makes use of a novel process in electrolysis) are patented, and there is no other known means of fully bleaching matured bamboo, except the antediluvian Chinese method of "retting."



BAMBOO



THE SMALL PICTURE WAS TAKEN  
WITH A SMALL FIXED FOCUS  
CAMERA, AND THE LARGE PICTURE  
IS ENLARGED FROM IT FOUR TIMES



PLEASURES OF A SMALL CAMERA

Under intelligent administration of tropical labor, especially under the farming system, which is so successful a feature of the sugar-cane industry in some of the West Indian islands, the raw material should not cost more than \$2 per long cord (approximately a ton), delivered at the mill, and the total cost per ton of pulp at a factory turning out 1,000 tons per month should not exceed \$30 for a high-grade bleached pulp, worth, at an extremely modest estimate, \$50.

To epitomize, the bamboo is the cheapest of all materials; the bi-sulphite is the cheapest of all chemical processes, and the new method of bleaching is much cheaper than any other method in present use.

[NOTE. The search for paper pulp material to meet the great and growing demand is of the greatest interest. The increasing scarcity and cost of spruce has already led to successful experiments with other woods, formerly disregarded, but experimenters are continually looking for material which can be grown more rapidly than trees. The foregoing article suggests a possible promising source of supply, but it must be remembered that bamboo is a tropical product and that our mills, representing an enormous investment, are in the North. The utilization of bamboo on a large commercial scale would involve a considerable readjustment of the pulp industry, and the solving of many questions, among which that of labor would not be the least. It can, therefore, hardly be regarded as a possibility of the immediate future, although well worth consideration in connection with an ultimate supply.—EDITOR.]



## THE PLEASURES OF A SMALL CAMERA

By R. S. KELLOGG

IN THIS day of take-down guns, condensed foods, and pocket editions, the small, high-powered camera fills a distinct need. The camper who goes into new country with his outfit on his back, the tourist who is already loaded with luggage, the scientist who carries necessarily heavy instruments, the every-day lover of the outdoors—all these observers find many a bit of scenery, many a tree or waterfall, rock or habitation, which they would give much to reproduce later at home, in office, laboratory or school room. To such as these, mere weight and bulk forbid the use of the ordinary camera, plates and tripod, which have long been thought essential to the production of good pictures. And to them the small, light, high-powered, fixed-focus, film camera has a wide range of pleasure and usefulness. Such a camera is always ready for action; it can be snapped almost as quickly as a gun can be fired and with as much accuracy. It is sighted like a gun, the object is seen at the instant of exposure, and bodies in motion are taken as readily as those at rest.

Moreover, such an instrument fills the long-felt want of a camera which will give depth and definition in snapshots and even on cloudy days. Its possessor is, therefore, much less limited by conditions and obtains a much larger percentage of good negatives than is possible with the old-style machines. None but the professional photographer who waits until every condition is exactly right can hope to get perfect results. The rest of us want an instrument that will record fairly well the passing scene at the instant we happen along; we can't wait for conditions to become favorable—the shot must be made then or not at all. With our old cameras we kept snapping away and trusting to luck for occasional good results. With the new kind we do better and are content to sacrifice size of negative for depth and definition under conditions that formerly gave neither.

Now we have an instrument weighing only two and one-half pounds, case and all, that we can carry anywhere and at any time, that works well under adverse conditions, which gives negatives that can be greatly enlarged if desired and which are especially adapted to making slides and illustrating articles. After carrying large cameras for a long time, the writer is thoroughly converted to the use of a small one. He prefers the  $1\frac{5}{8} \times 2\frac{1}{2}$  to the  $5 \times 7$  for several reasons, but chiefly because he gets many pictures that with a larger instrument he would not have gotten at all. The camera is taken along now where it was formerly left at home, and the size of the negative is of little importance if quality be present.

The accompanying samples partially show the possibilities of the small hand camera. All of them are snapshots, the exposures varying from 1-30 to 1-500 of a second. The first four were taken on a day of complete cloudiness, the others in bright sunshine.



A BUNK HOUSE  
IN THE WOODS

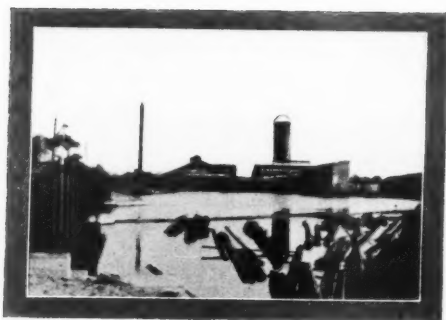
THE FOREST  
PRIMEVAL  
WHITE AND  
NORWAY PINE



SHORE LINE OF  
A WISCONSIN LAKE

WORK OF A SMALL CAMERA

LOG POND  
AND SAWMILL



A CROOKED TREE ON THE  
RIVER BANK

SEEING THE  
COUNTY FAIR



WORK OF A SMALL CAMERA

## EDITORIAL

### OPENING OF THE FOREST FIRE SEASON

**A** LETTER just received from one of the oldest and best known forestry workers in the East says: "I am about crazy over forest fires which seem to rage hereabouts with more destruction and over greater area than ever before. We are doing the best we can to control them, but control is not the thing. Prevention is what is needed, and that will not come until public opinion deems a forest fire on a level with barn burning or the destruction by fire of any building not occupied by persons residing therein."

This is written from long experience and forms a good introduction to the numerous dispatches in newspapers from all sections of the country which give ample evidence that the forest fire season of 1911 has opened with a rush and that every resource will have to be called into action if we are to prevent a repetition during the coming season of the tragic experiences of last year. A long succession of increasingly dry years have supplied in our woods and forests all the conditions favorable to combustion. It remains to be seen how much we have profited by the lessons that have been administered to us with such unsparing severity.

Southern New England has been hard hit this spring, but the woodlands of Massachusetts and Connecticut are not of such magnitude as to offer the spectacular conflagrations of the lake states and the Northwest. Maine has its fires under comparative control, and we look for similar efficiency under the new state system in New Hampshire, combined with a strong organization of the large timberland owners. Vermont has not been a heavy sufferer, and it, too, has strengthened its defences. But none of these states are free from the scourge, and the words quoted at the beginning of this article are from a state that has been a leader in the efficiency of its forestry organization.

In the lake states much study has been given to the subject of fire control since the terrible visitation of last year and improved state organizations, especially in Minnesota, and the Northern Protective Association, made up of timberland owners of Wisconsin and Michigan, are new factors that should prove their worth this season.

In the national forests everything has been done to strengthen the weak spots in accordance with the lessons of last summer, as far as an inadequate appropriation will permit, but it is an unequal struggle that is forced by present conditions upon the efficient and courageous men of the Forest Service. From a straight business standpoint a larger investment would bring better returns. Mr. Allen's article in this magazine shows what the Western Forestry and Conservation Association, the pioneer protective organization of timberland owners, has been able to accomplish in the northwestern forests. These results, it must be remembered, have been obtained by following Forest Service methods, under men trained in the Forest Service; but these private owners apply these methods thoroughly, as good business demands, while Congress

compromises with the political enemies of the national forest system and refuses an appropriation adequate for thoroughly effective work.

There have, however, unquestionably been great improvements in efficiency all along the line, and we may fairly hope to see some results this season in the checking of conflagrations. The new cooperative arrangements between the national and state governments, which are already being entered into and will be made as fast as possible with states that can qualify for such cooperation, are an important step forward and will, without a shadow of doubt, be productive of valuable results.

In forming judgment as to the results of defensive work during the season there must always be borne in mind the natural difficulties, pointed out so clearly by our fair-minded German critic, Dr. Deckert, in the article of which we recently published a translation. In the great forests of our western mountains ideal conditions of safety cannot be brought about except in a long term of years. In the populous eastern states, however, with their wealth of resources, there can be no reason for heavy forest fires except general public negligence and parsimony. Upon those whose carelessness causes the fires and upon the legislators who fail to provide sufficient police and preventive organization rests a heavy burden of responsibility. The carelessness of the American people with regard to the annual fire loss is a national disgrace, but if we gave half the attention to preventing the burning of forests, which cannot be replaced or insured, that we do to the burning of buildings, which can be both insured and replaced, we should be in much safer condition than we are today.

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#### A NATIONAL FOREST AT THE NATIONAL CAPITAL

**W** E BESPEAK a thoughtful and sympathetic reading of Mr. Ellicott's article on the project to which he has given so much unselfish thought and effort, of a national forest to include the large area of wooded lands between the cities of Washington and Baltimore, and a strip along the Potomac near Great Falls. This proposal is in line with what we are beginning to learn of the value of the forest for its products, its beauty, and the opportunity that it gives for recreation. We are learning that forestry is not alone for the great mountain wilderness. That our urban communities have need of it, and that those which are fortunate enough to be able to acquire municipal forests should do so while the opportunity is here.

Washington is peculiarly favored in this respect. The country about it is not so fully populated as to make land values high or to prevent the acquisition of large areas for forestry purposes. Moreover, the natural conditions, as Mr. Besley's report shows, clearly suggest the proposed treatment. The resources of the nation stand behind the development and beautification of its capital city. Here is the headquarters of the United States Forest Service, which could make the best use of a forest at its doors for either scientific or practical demonstration, and this could be done with the greatest economy. As has also been well suggested, the Department of Agriculture might have experimental farms in the area which would be of value to the department and would be most accessible for study by the interested public.

The ancient Swiss city of Zürich holds its great municipal forest, the Sihlwald, among its proudest possessions, and it draws therefrom a rich annual income both in cash revenue and in the healthful enjoyment of its people.

This is possible for Washington on an even larger scale as becomes the capital of this great nation. The project appeals both to the imagination and to every-day business sense. The environs of Washington today are not a credit to the city or the nation. While we are spending millions for public buildings, why not designate a very few of these millions to make a fit setting for the national city we are building?

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#### THE SUPREME COURT DECISIONS

THE recent decisions of the Supreme Court of the United States in the California and Colorado grazing cases are an important milestone in our national development. For a long time the interests inimical to the national forests have been looking forward to a possible victory on the issues involved in these cases, which would give the control of the national forests over to the states in which they lie. So much hope for this did the state authorities of Colorado see in the Light case that the attorney general of the state came on and aided the appellant. At the first hearing of the California cases the court divided, but when the cases were reopened the court held unanimously for the government on every point. So thoroughly were the issues gone into that the court itself undoubtedly gained a much fuller appreciation of their gravity than it had at the beginning. Every possible point was raised against federal control, with the idea of making these test cases.

In the California cases the main question at issue was the right of the Secretary of Agriculture to make regulations for the management of the national forests and the authority of these regulations when made, the defendants—Grimaud, Carajous, and Inda—claiming that these regulations usurped the powers of Congress, which could not delegate its legislative powers, and were therefore void.

The court admitted the difficulty of drawing the line in many cases, between legislative and administrative functions, but found no difficulty in these cases, the exercise of powers by the Secretary of Agriculture being purely administrative and fully sanctioned by the various acts creating the forests and giving him authority over them. "The authority to make administrative rules," says the Court, "is not a delegation of legislative power, nor are such rules raised from an administrative to a legislative character, because the violation thereof is punished as a public offence." The decision of the lower court, which sustained the demurrer of the defendant, was reversed.

Every forest officer can breathe a little easier for this decision, knowing that the highest judicial authority in the land has sustained the legality of the rules he is administering.

The Light case, which came up on appeal of Light, a Colorado ranchman, convicted in the circuit court of wilfully violating the regulations governing the national forests and turning his cattle into the Holy Cross forest without a permit, involved the question of state or federal control of the public lands, since the defendant claimed the benefit of the Colorado statute requiring the owner of land to erect and maintain a fence of a given height and strength, and it was further contended that Congress could not withdraw large bodies of land from settlement without the consent of the state in which such lands are located. This claim, of course, struck at the very foundation of the national forest system, but the disposition of it by the Court was sweeping and complete. The United States is an owner with full control over its own

property and that control is vested in Congress. Against the contention of some of the western states that the public lands are held in trust for the people of those states, the Court sets up the broader doctrine that "All the public lands of the nation are held in trust for the people of the whole country," and it is for Congress, not the courts, to determine how that trust should be administered.

To those who have followed the discussion of questions relating to the powers of the national government with regard to public lands, it will be evident that these decisions of a united court settle clearly and finally the fundamental questions of the rights of the nation as an owner, the legislative powers of Congress, and the administrative powers of the executive department, which may be in charge of such lands. The development of a national policy for dealing with our natural resources can now proceed with surer footing along a road more fairly marked.

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#### A FORCED ISSUE

WE REGRET to see *Mining Science* giving currency to sensational reports of unrest in Alaska caused, it is alleged, by the regulations of the national Forest Service. According to the correspondent of *Mining Science*, the only remedy is the purchase of Alaska by Canada. The chief sponsor for this amazing proposal is a Canadian "who has important holdings in the province (British Columbia) and territory." A great deal is said by this gentleman about the unsatisfactory boundary and the difficulty of operating on both sides of the line. It is not a new suggestion that the Alaskan boundary is unsatisfactory to Canadians. But what has that to do with the rules of the Forest Service? It almost always happens that an international boundary line is unsatisfactory if there is a considerable amount of natural wealth on both sides of the fence. Two or three citizens of this country who have had mining interests in the North are quoted as agreeing with the Canadian.

The grievance at the root of all these complaints is the familiar one of men who find that the great property purchased of Russia, through Secretary Seward's foresight, by and for the whole nation, cannot be used solely for the immediate profit of a few individuals, but is to be guarded and maintained as a permanent contributor to the general welfare. It is undoubtedly true that a check has been placed temporarily upon the development of the resources of Alaska, but the responsibility for this lies not with the very reasonable rules of the Forest Service, but its root is to be found in the attempts which have been made by large moneyed interests to exploit these resources for their own benefit and without much regard to national regulations. Under these circumstances it became necessary to call a halt, and if many enterprising and self-reliant individuals who have gone into Alaska to better their fortunes have suffered somewhat by this delay, it is to be regretted, but it is difficult to see how it could be prevented and the interest of the greater number be properly protected.

It is quite natural that men who have gone into the wilderness and stood alone, measuring their strength against the strength of the frozen North until they seemed to be the center of the universe, should find it difficult to turn their gaze backward to the increasing millions whom they left behind them, and to reduce the colossal fortunes of their dreams to a reasonable share in that

which they did not create or pay for, but which nature and the United States government placed in the hands of this nation.

One of those quoted in the article to which we have reference says that two-thirds of the sixty thousand inhabitants of the territory are aborigines, and that the white population is about one-fourth of what it was ten years ago. Does this man think that releasing control to some of our great financial interests would increase materially the white population of the country? There can be little doubt from the present trend of things that if the government got out, these interests would get in and but few smaller operators would benefit by the change. The government does not shut out regulated private enterprise. The other type of ownership would.

But there remains that suggestion of a sale to Canada, which our Canadian friend thinks could develop Alaska better than the United States. Does he take into account the fact that we know something about Alaska now, and that the price has risen since its purchase from Russia? Not only would a great and somewhat inhospitable territory have to be bought, but a vast amount of known and potential forest and mineral property. We question whether Canada could pay the price, which would be staggering in its size.



## THE GRAZING CASES DECIDED

(Opinion of the Supreme Court in the California and Colorado National Forest Cases)

On the first of May the Supreme Court of the United States handed down decisions in the grazing cases which were fixed upon by the enemies of the national forests to test their legality and that of the regulations adopted for their control. The first of these cases was that of *The United States*, plaintiff in error, *v. Pierre Grimaud and J. P. Carajous*, with which was joined that of the same *v. Antonio Inda*. Both of these cases were brought up from the District Court of the United States for the Southern District of California.

### OPINION OF THE COURT.

By the act of March 3, 1891 (26 Stat., 1103), the President was authorized, from time to time, to set apart and reserve, in any State or Territory, public lands, wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public forest reservations. And by the act of June 4, 1897 (30 Stat., L. 35), the purposes of these reservations were declared to be "to improve and protect the forest within the reservation, and to secure favorable conditions of water flows, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States." \* \* \* "All water on such reservations may be used for domestic, mining, milling or irrigation purposes, under the laws of the State wherein such forest reservations are situated, or under the laws of the United States and the rules and regulations established thereunder." (30 Stat., 36.)

It is also provided that nothing in the act "should be construed as prohibiting the egress and ingress of actual settlers residing within the boundaries of such reservation." \* \* \* "nor shall anything herein \* \* \* prohibit any person from entering upon such forest reservation for all proper and lawful purposes, \* \* \* provided that such persons comply with the rules and regulations covering such forest reservation."

There were special provisions as to the sale of timber from any reserve (except those in the State of California, 30 Stat., 35; 31 Stat., 661), and a requirement that the proceeds thereof and from any other forest source should be covered into the Treasury, the act of February 1st, 1905 (33 Stat., 628), providing that "all money

received from the sale of any products or the use of any land or resources of said forest reserve shall be covered into the Treasury of the United States for a period of five years from the passage of this act, shall constitute a special fund available, until expended, as the Secretary of Agriculture may direct, for the protection, administration, improvement and extension of Federal Forest Reserves."

The act of 1905, as to receipts arising from the sale of any products or the use of any land was, in some respects, modified by the act of March 4, 1907. It provided that all moneys received after July 1, 1907, by or on account of forest service timber, or from any other source of forest reservation revenue, shall be covered into the Treasury, "provided that ten per cent of all money received from each forest reserve during any fiscal year, including the year ending June 30, 1906, shall be paid at the end thereof by the Secretary of the Treasury to the State or Territory in which said reserve is situated, to be expended, as the State or Territorial legislature may prescribe, for the benefit of the public schools and public roads in the county or counties in which the forest reserve is situated." 34 Stat., 1270.

The jurisdiction, both civil and criminal, over persons within such reservation was not to be affected by the establishment thereof "except so far as the punishment of offenses against the United States therein is concerned; the intent being that the State shall not by reason of the establishment of the reserve lose its jurisdiction, nor the inhabitants thereof their rights and privileges as citizens, or be absolved from their duty as citizens of the State."

The original act provided that the management and regulation of these reserves should be by the Secretary of the Interior, but in 1905 that power was conferred upon the Secretary of Agriculture (33 Stat., L. 628), and by virtue of those various statutes he was authorized to "make provision for the protection against destruction by fire and depredations upon the public forests and forest reservations \* \* \* ; and he may make such rules and regulations and establish such service as will insure the objects of such reservation, namely, to regulate their occupancy and use, and to preserve the forests thereon

from destruction; and any violation of the provisions of this act or such rules and regulations shall be punished as prescribed in Rev. Stat., 5388," which, as amended, provides for a fine of not more than five hundred dollars and imprisonment for not more than twelve months, or both, at the discretion of the court. 26 Stat., 1103; 30 Stat., 34; 30 Stat., 35; 31 Stat., 661; 33 Stat., 36; 7 Fed. Stat. Anno., 310-317, 296, Supp. 1909, p. 634.

Under these acts the Secretary of Agriculture, on June 12, 1906, promulgated and established certain rules for the purpose of regulating the use and occupancy of the public forest reservations and preserving the forests thereon from destruction, and among those established was the following:

"Regulation 45. All persons must secure permits before grazing any stock in a forest reserve, except the few head in actual use by prospectors, campers and travelers and milch or work animals, not exceeding a total of six head, owned by *bona fide* settlers residing in or near a forest reserve, which are excepted and require no permit."

The defendants were charged with driving and grazing sheep on a reserve, without a permit. The grand jury in the District Court for the Southern District of California, at the November term, 1907, indicted Pierre Grimaud and J. P. Carajous, charging that on April 26, 1907, after the Sierra Forest Reserve had been established, and after regulation 45 had been promulgated, "they did knowingly, willfully and unlawfully pasture and graze and cause and procure to be pastured and grazed certain sheep (the exact number being to the grand jurors unknown) upon certain land within the limits of and a part of said Sierra Forest Reserve, without having theretofore or at any time secured or obtained a permit or any permission for said pasturing or grazing of said sheep or any part of them, as required by the said rules and regulations of the Secretary of Agriculture," the said sheep not being within any of the excepted classes. The indictment concluded, "contrary to the form of the statutes of the United States in such case made and provided, and against the peace and dignity of the said United States."

The defendants demurred, upon the ground (1) that the facts stated did not constitute a public offense, or a public offense against the United States, and (2) that the acts of Congress making it an offense to violate rules and regulations made and promulgated by the Secretary of Agriculture are unconstitutional, in that they are an attempt by Congress to delegate its legislative power to an administrative officer." The court sustained the demurrers (170 Fed., 205), and made a like ruling on the similar indictments in

*U. S. v. Inda*, 216 U. S., 614. Both judgments were affirmed by a divided court. Afterwards petitions for rehearing were granted.

Mr. Justice Lamar, after making the foregoing statements, delivered the opinion of the Court.

The defendants were indicted for grazing sheep on the Sierra Forest Reserve without having obtained the permission required by the regulations adopted by the Secretary of Agriculture. They demurred on the ground that the Forest Reserve Act of 1891 was unconstitutional, in so far as it delegated to the Secretary of Agriculture power to make rules and regulations and made a violation thereof a penal offense. Their several demurrers were sustained. The Government brought the case here under that clause of the Criminal Appeals Act (34 Stat., 1246), which allows a writ of error where the "decision complained of was based upon the invalidity of the statute."

The Federal courts have been divided on the question as to whether violations of those regulations of the Secretary of Agriculture constitute a crime. The rules were held to be valid for civil purposes in *Dastervignes v. United States*, 122 Fed., 30; *United States v. Dastervignes*, 118 Fed., 199; *United States v. Shannon*, 151 Fed., 863; *Ibid.* 160 Fed., 870. They were also sustained in criminal prosecutions in *United States v. Deguirro*, 152 Fed., 568; *United States v. Domingo*, 152 Fed., 566; *United States v. Bale*, 156 Fed., 637; *United States v. Rizzinelli*, 182 Fed., 675. But the regulations were held to be invalid in *United States v. Biasingame*, 116 Fed., 654; *United States v. Matthews*, 146 Fed., 306; *United States v. Dent*, 8 Ariz., 138.

From the various acts relating to the establishment and management of forest reservations it appears that they were intended "to improve and protect the forest and to secure favorable conditions of water flows." It was declared that the acts should not be "construed to prohibit the egress and ingress of actual settlers" residing therein nor "to prohibit any person from entering the reservation for all proper and lawful purposes, including prospecting, and locating and developing mineral resources; provided that such persons comply with the rules and regulations covering such forest reservation." (Act of 1897, 30 Stat., 36.) It was also declared that the Secretary "may make such rules and regulations and establish such service as will insure the objects of such reservation, namely, to regulate their occupancy and use and to preserve the forests thereon from destruction; and any violation of the provisions of this act or such rules and regulations shall be punished" as is provided in Sec. 5388 of the Revised Statutes, as amended.

Under these acts, therefore, any use of the reservation for grazing or other lawful purpose was required to be subject to the rules and regulations established by the Secretary of Agriculture. To pasture sheep and cattle on the reservation, at will and without restraint, might interfere seriously with the accomplishment of the purposes for which they were established. But a limited and regulated use for pasturage might not be inconsistent with the object sought to be attained by the statute. The determination of such questions, however, was a matter of administrative detail. What might be harmless in one forest might be harmful to another. What might be injurious at one stage of timber growth, or at one season of the year, might not be so at another.

In the nature of things it was impracticable for Congress to provide general regulations for these various and varying details of management. Each reservation had its peculiar and special features; and in authorizing the Secretary of Agriculture to meet these local conditions Congress was merely conferring administrative functions upon an agent, and not delegating to him legislative power. The authority actually given was much less than what has been granted to municipalities by virtue of which they make by-laws, ordinances and regulations for the government of towns and cities. Such ordinances do not declare general rules with reference to rights of persons and property, nor do they create or regulate obligations and liabilities, nor declare what shall be crimes nor fix penalties therefor.

By whatever name they are called they refer to matters of local management and local police. *Brodhine v. Revere*, 182 Mass., 599. They are "not of legislative character in the highest sense of that term; and as an owner may delegate to his principal agent the right to employ subordinates, giving them a limited discretion, so it would seem that Congress might rightfully entrust to the local legislature (authorities) the determination of minor matters." *Butte City Water Co. v. Baker*, 165 U. S., 126.

It must be admitted that it is difficult to define the line which separates legislative power to make laws, from administrative authority to make regulations. This difficulty has often been recognized, and was referred to by Chief Justice Marshall in *Wayman v. Southard*, 10 Wheat., 42, where he was considering the authority of courts to make rules. He there said: "It will not be contended that Congress can delegate to the courts, or any other tribunal, powers which are strictly and exclusively legislative. But Congress may certainly delegate to others, powers which the legislature may rightfully exercise itself." What were these non-legislative powers which Con-

gress could exercise but which might also be delegated to others, was not determined, for he said: "The line has not been exactly drawn which separates those important subjects which *must* be entirely regulated by the legislature itself, from those of less interest, in which a general provision may be made, and power given to those who are to act under such general provision to fill up the details."

From the beginning of the Government various acts have been passed conferring upon executive officers power to make rules and regulations—not for the government of their departments, but for administering the laws which did govern. None of these statutes could confer legislative power. But when Congress had legislated and indicated its will, it could give to those who were to act under such general provisions "power to fill up the details" by the establishment of administrative rules and regulations, the violation of which could be punished by fine or imprisonment fixed by Congress, or by penalties fixed by Congress or measured by the injury done.

Thus it is unlawful to charge unreasonable rates or to discriminate between shippers, and the Interstate Commerce Commission has been given authority to make reasonable rates and to administer the law against discrimination. *Int. Com. v. Ill. Cent. R. R.*, 215 U. S., 452; *Int. Com. v. Chicago, Rock Island, &c., R. R.*, 218 U. S., 88. Congress provided that after a given date only cars with drawbars of uniform height should be used in interstate commerce, and then constitutionally left to the Commission the administrative duty of fixing a uniform standard. *Saint Louis & Iron Mountain R. R. v. Taylor*, 210 U. S., 287. In *Union Bridge Co. v. United States*, 204 U. S., 364; *In re Kollock*, 165 U. S., 526; *Butterfield v. Stranahan*, 192 U. S., 470, it appeared from the statutes involved that Congress had either expressly or by necessary implication made it unlawful, if not criminal, to obstruct navigable streams; to sell unbranded oleomargarine; or to import unwholesome teas. With this unlawfulness as a predicate the executive officers were authorized to make rules and regulations appropriate to the several matters covered by the various acts. A violation of these rules was then made an offense punishable as prescribed by Congress. But in making these regulations the officers did not legislate. They did not go outside of the circle of that which the act itself had affirmatively required to be done, or treated as unlawful if done. But confining themselves within the field covered by the statute they could adopt regulations of the nature they had thus been generally authorized to make, in order to administer the law and carry the statute into effect.

The defendants rely on *United States v.*

*Eaton*, 144 U. S., 677, where the act authorized the Commissioner to make rules for carrying the statute into effect, but imposed no penalty for failing to observe his regulations. Another section (5) required that the dealer should keep books showing certain facts, and providing that he should conduct his business under such surveillance of officers as the Commissioner might by regulation require. Another section declared that if any dealer should knowingly omit to do any of the things "required by law" he should pay a penalty of a thousand dollars. *Eaton* failed to keep the books required by the regulations. But there was no charge that he omitted "anything required by law," unless it could be held that the books called for by the regulations were "required by law." The court construed the act as a whole and proceeded on the theory that while a violation of the regulations might have been punished as an offense if Congress had so enacted, it had, in fact, made no such provision so far as concerned the particular charge then under consideration. Congress required the dealer to keep books rendering return of materials and products, but imposed no penalty for failing so to do. The Commissioner went much further and required the dealer to keep books showing oleomargarine received, from whom received and to whom the same was sold. It was sought to punish the defendant for failing to keep the books required by the regulations. Manifestly this was putting the regulations above the statute. The court showed that when Congress enacted that a certain sort of book should be kept, the Commissioner could not go further and require additional books; or, if he did make such regulation, there was no provision in the statute by which a failure to comply therewith could be punished. It said that, "If Congress intended to make it an offense for wholesale dealers to omit to keep books and render returns required by regulations of the Commissioner, it would have done so distinctly"—implying that if it had done so distinctly the violation of the regulations would have been an offense.

But the very thing which was omitted in the oleomargarine act has been distinctly done in the Forest Reserve Act, which, in terms, provides that "any violation of the provisions of this act or such rules and regulations of the Secretary shall be punished as prescribed in section 5388 of the Revised Statutes as amended."

In *Union Bridge Co. v. United States*, 204 U. S., 386, Justice Harlan, speaking for the court, said:

"By the statute in question Congress declared in effect that navigation should be freed from unreasonable obstructions arising from bridges of insufficient height,

width of span or other defects. It stopped, however, with the declaration of a general rule and imposed upon the Secretary of War the duty of ascertaining what particular cases came within the rule prescribed by Congress, as well as the duty of enforcing the rule in such cases. In performing that duty the Secretary of War will only execute the clearly expressed will of Congress, and will not, in any true sense, exert legislative or judicial power."

And again he said in *Field v. Clark*, 143 U. S., 694:

"The legislature cannot delegate its power to make law, but it can make a law to delegate a power to determine some fact or state of things upon which the law makes or intends to make its own action depend. To deny this would be to stop the wheels of government. There are many things upon which wise and useful legislation must depend which cannot be known to the lawmaking power and must therefore be a subject of inquiry and determination outside of the halls of legislation." See also *Coha v. United States*, 152 U. S., 211; *United States v. Bailey*, 9 Pet., 238; *Cosmos Co. v. Gray Eagle Co.*, 190 U. S., 309; *Oceanic Navigation Co. v. Stranahan*, 214 U. S., 333; *Roughton v. Knight*, October Term, 1910; *Smith v. Whitney*, 116 U. S., 167; *ex parte Reed*, 100 U. S., 22; *Gratiot v. United States*, 4 How., 81.

In *Brodvine v. Revere*, 182 Mass., 599, a boulevard and park board was given authority to make rules and regulations for the control and government of the roadways under its care. It was there held that the provision in the act that breaches of the rules thus made should be breaches of the peace, punishable in any court having jurisdiction, was not a delegation of legislative power which was unconstitutional. The court called attention to the fact that the punishment was not fixed by the board, saying that the making of the rules was administrative, while the substantive legislation was in the statute which provided that they should be punished as breaches of the peace.

That "Congress cannot delegate legislative power is a principle universally recognized as vital to the integrity and maintenance of the system of government ordained by the Constitution." *Field v. Clark*, 143 U. S., 692. But the authority to make administrative rules is not a delegation of legislative power, nor are such rules raised from an administrative to a legislative character because the violation thereof is punished as a public offense.

It is true that there is no act of Congress which, in express terms, declares that it shall be unlawful to graze sheep on a forest reserve. But the statutes, from which we have quoted, declare, that the privilege of

using reserves for "all proper and lawful purposes" is subject to the proviso that the person so using them shall comply "with the rules and regulations covering said forest reservation." The same act makes it an offense to violate those regulations, that is, to use them otherwise than in accordance with the rules established by the Secretary. Thus the implied license under which the United States had suffered its public domain to be used as a pasture for sheep and cattle, mentioned in *Buford v. Houtz*, 133 U. S., 326, was curtailed and qualified by Congress, to the extent that such privilege should not be exercised in contravention of the rules and regulations. *Wilcox v. Jackson*, 13 Pet., 513.

If, after the passage of the act and the promulgation of the rule, the defendants drove and grazed their sheep upon the reserve, in violation of the regulations, they were making an unlawful use of the Government's property. In doing so they thereby made themselves liable to the penalty imposed by Congress.

It was argued that, even if the Secretary could establish regulations under which a permit was required, there was nothing in the act to indicate that Congress had intended or authorized him to charge for the privilege of grazing sheep on the reserve. These fees were fixed to prevent excessive grazing and thereby protect the young growth, and native grasses, from destruction, and to make a slight income with which to meet the expenses of management. In addition to the general power in the act of 1897, already quoted, the act of February 1st, 1905, clearly indicates that the Secretary was authorized to make charges out of which a revenue from forest resources was expected to arise. For it declares that "all money received from the sale of any products or the use of any land or resources of said forest reserve" shall be covered into the Treasury and be applied toward the payment of forest expenses. This act was passed before the promulgation of regulation 45, set out in the indictment.

Subsequent acts also provide that money received from "any source of forest reservation revenue" should be covered into the Treasury, and a part thereof was to be turned over to the Treasurers of the respective States to be expended for the benefit of the public schools and public roads in the counties in which the forest reserves are situated. (34 Stat., 684, 1270.)

The Secretary of Agriculture could not make rules and regulations for any and every purpose. *Williamson v. United States*, 207 U. S., 462. As to those here involved, they all relate to matters clearly indicated and authorized by Congress. The subjects as to which the Secretary can regulate are defined. The lands are set apart as a forest reserve. He is required to make provision to protect them from depreda-

tions and from harmful uses. He is authorized "to regulate the occupancy and use and to preserve the forests from destruction." A violation of reasonable rules regulating the use and occupancy of the property is made a crime, not by the Secretary, but by Congress. The statute, not the Secretary, fixes the penalty.

The indictment charges, and the demurrer admits, that Rule 45 was promulgated for the purpose of regulating the occupancy and use of the public forest reservation and preserving the forest. The Secretary did not exercise the legislative power of declaring the penalty or fixing the punishment for grazing sheep without a permit, but the punishment is imposed by the act itself. The offense is not against the Secretary, but, as the indictment properly concludes, "contrary to the laws of the United States and the peace and dignity thereof." The demurrers should have been overruled. The affirmances by a divided court heretofore entered are set aside and the judgments in both cases reversed.

#### LIGHT VERSUS THE UNITED STATES.

This case, *Fred Light*, appellant, v. *The United States*, was an appeal from the Circuit Court of the United States for the District of Colorado. The following statement was made by Mr. Justice Lamar:

The Holy Cross Forest Reserve was established under the provisions of the act of March 3, 1891. By that and subsequent statutes the Secretary of Agriculture was authorized to make provisions for the protection against destruction by fire and depredations of the public forest and forest reservations and "to make such rules and regulations and establish such service as would insure the objects of such reservation, namely, to regulate their occupancy and use, and to preserve the forests thereon from destruction." 26 Stat., L. 1103; 30 Stat., L. 35, Act of Congress February 1, 1905; 7 Fed. Stat. Ann., 310, 312, and Supp. for 1909, page 663. In pursuance of these statutes regulations were adopted establishing grazing districts on which only a limited number of cattle were allowed. The regulations provided that a few head of cattle of prospectors, campers and not more than ten belonging to a settler residing near the forest might be admitted without permit, but saving these exceptions the general rule was that "all persons must secure permits before grazing any stock in a national forest."

On April 7, 1908, the United States, through the district attorney, filed a bill in the Circuit Court for the District of Colorado reciting the matters above outlined, and alleging that the defendant Fred Light owned a herd of about 500 cattle and a ranch of 540 acres, located two and a half miles to the east and five miles to the north of the reservation. This herd was turned out to

range during the spring and summer, and the ranch then used as a place on which to raise hay for their sustenance.

That between the ranch and the reservation was other public and unoccupied land of the United States; but, owing to the fact that only a limited number of cattle were allowed on the reservation, the grazing there was better than on this public land. For this reason, and because of the superior water facilities and the tendency of the cattle to follow the trails and stream leading from the ranch to the reservation, they naturally went direct to the reservation. The bill charged that the defendant when turning them loose knew and expected that they would go upon the reservation, and took no action to prevent them from trespassing. That by thus knowingly and wrongfully permitting them to enter on the reservation he intentionally caused his cattle to make a trespass, in breach of the United States property and administrative rights, and has openly and privately stated his purpose to disregard the regulations, and without permit to allow and, in the manner stated, to cause his cattle to enter, feed and graze thereon.

The bill prayed for an injunction. The defendant's general demurrer was overruled.

His answer denied that the topography of the country around his ranch or the water and grazing conditions were such as cause his cattle to go on the reservation; he denied that many of them did go thereon, though admitting that some had grazed on the reservation. He admitted that he had liberated his cattle without having secured or intending to apply for a permit, but denied that he willfully or intentionally caused them to go on the reservation, submitting that he was not required to obtain any such permit. He admits that it is his intention hereafter, as heretofore, to turn his cattle out on the unreserved public land of the United States adjoining his ranch to the northeast thereof, without securing or applying for any permit for the cattle to graze upon the so-called Holy Cross Reserve; denies that any damage will be done if they do go upon the reserve; and contends that, if because of their straying proclivities, they shall go on the reserve, the complainant is without remedy against the defendant at law or in equity so long as complainant fails to fence the reserve as required by the laws of Colorado. He claims the benefit of the Colorado statute requiring the owner of land to erect and maintain a fence of given height and strength, in default of which the owner is not entitled to recover for damage occasioned by cattle or other animals going thereon.

Evidence was taken, and after hearing, the Circuit Court found for the Government

and entered a decree enjoining the defendant from in any manner causing, or permitting, his stock to go, stray upon or remain within the said forest or any portion thereof.

The defendant appealed and assigned that the decree against him was erroneous; that the public lands are held in trust for the people of the several States, and the proclamation creating the reserve without the consent of the State of Colorado is contrary to, and in violation of, said trust; that the decree is void because it in effect holds that the United States is exempt from the municipal laws of the State of Colorado relating to fences; that the statute conferring upon the said Secretary of Agriculture the power to make rules and regulations was an unconstitutional delegation of authority to him and the rules and regulations therefore void; and that the rules mentioned in the bill are unreasonable, do not tend to insure the object of forest reservation and constitute an unconstitutional interference by the Government of the United States with fence and other statutes of the State of Colorado, enacted through the exercise of the police power of the State.

Mr. Justice Lamar, after making the foregoing statement, delivered the opinion of the Court.

The defendant was enjoined from pasturing his cattle on the Holy Cross Forest Reserve, because he had refused to comply with the regulations adopted by the Secretary of Agriculture, under the authority conferred by the act of June 4, 1897 (30 Stat., 35), to make rules and regulations as to the use, occupancy and preservation of forests. The validity of the rule is attacked on the ground that Congress could not delegate to the Secretary legislative power. We need not discuss that question in view of the opinion in *United States v. Grimaud*, just decided.

The bill alleged, and there was evidence to support the finding, that the defendant, with the expectation and intention that they would do so, turned his cattle out at a time and place which made it certain that they would leave the open public lands and go at once to the Reserve, where there was good water and fine pasturage. When notified to remove the cattle, he declined to do so and threatened to resist if they should be driven off by a forest officer. He justified this position on the ground that the statute of Colorado provided that a landowner could not recover damages for trespass by animals unless the property was enclosed with a fence of designated size and material. Regardless of any conflict in the testimony, the defendant claims that unless the Government put a fence around the Reserve it had no remedy, either at law or in equity, nor could he

be required to prevent his cattle straying upon the Reserve from the open public land on which he had a right to turn them loose.

At common law the owner was required to confine his live stock, or else was held liable for any damage done by them upon the land of third persons. That law was not adapted to the situation of those States where there were great plains and vast tracts of unenclosed land, suitable for pasture. And so, without passing a statute, or taking any affirmative action on the subject, the United States suffered its public domain to be used for such purposes. There thus grew up a sort of implied license that these lands, thus left open, might be used so long as the Government did not cancel its tacit consent. *Buford v. Houtze*, 133 U. S., 326. Its failure to object, however, did not confer any vested right on the complainant, nor did it deprive the United States of the power of recalling any implied license under which the land had been used for private purposes. *Steele v. United States*, 113 U. S., 130; *Wilcox v. Jackson*, 13 Pet., 513.

It is contended, however, that Congress cannot constitutionally withdraw large bodies of land from settlement without the consent of the State where it is located; and it is then argued that the act of 1891 providing for the establishment of reservations was void, so that what is nominally a Reserve is, in law, to be treated as open and uninclosed land, as to which there still exists the implied license that it may be used for grazing purposes. But "the Nation is an owner, and has made Congress the principal agent to dispose of its property." \* \* \* "Congress is the body to which is given the power to determine the conditions upon which the public lands shall be disposed of." *Butte City Water Co. v. Baker*, 196 U. S., 126. "The Government has with respect to its own land the rights of an ordinary proprietor to maintain its possession and prosecute trespassers. It may deal with such lands precisely as an ordinary individual may deal with his farming property. It may sell or withhold them from sale." *United States v. Canfield*, 167 U. S., 524. And if it may withhold from sale and settlement it may also as an owner object to its property being used for grazing purposes, for "the Government is charged with the duty and clothed with the power to protect the public domain from trespass and unlawful appropriation." *United States v. Beebe*, 127 U. S., 342.

The United States can prohibit absolutely or fix the terms on which its property may be used. As it can withhold or reserve the land it can do so indefinitely. *Stearns v. Minnesota*, 179 U. S., 243. It is true that the "United States do not and cannot hold property as a monarch may for private or personal purposes." *Van Brocklin v. Ten-*

*nessee*, 117 U. S., 153. But that does not lead to the conclusion that it is without the rights incident to ownership, for the Constitution declares, Sec. 3, Art. IV, that "Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or the property belonging to the United States." "The full scope of this paragraph has never been definitely settled. Primarily, at least, it is a grant of power to the United States of control over its property." *Kansas v. Colorado*, 206 U. S., 89.

"All the public lands of the nation are held in trust for the people of the whole country." *United States v. Trinidad Coal Co.*, 138 U. S., 160. And it is not for the courts to say how that trust shall be administered. That is for Congress to determine. The courts cannot compel it to set aside the lands for settlement; or to suffer them to be used for agricultural or grazing purposes; nor interfere when, in the exercise of its discretion, Congress establishes a forest reserve for what it decides to be national and public purposes. In the same way and in the exercise of the same trust it may disestablish a reserve, and devote the property to some other national and public purpose. These are rights incident to proprietorship, to say nothing of the power of the United States as a sovereign over the property belonging to it. Even a private owner would be entitled to protection against willful trespasses, and statutes providing that damage done by animals cannot be recovered, unless the land had been inclosed with a fence of the size and material required, do not give permission to the owner of cattle to use his neighbor's land as a pasture. They are intended to condone trespasses by straying cattle; they have no application to cases where they are driven upon unfenced land in order that they may feed there. *Lazarus v. Phelps*, 152 U. S., 81; *Moore v. Cannon*, 24 Mont., 324; *St. Louis Cattle Co. v. Vaught*, 1 Tex. App., 388; *The Union Pacific v. Rollins*, 5 Kans., 176.

Fence laws do not authorize wanton and willful trespass, nor do they afford immunity to those who, in disregard of property rights, turn loose their cattle under circumstances showing that they were intended to graze upon the lands of another.

This the defendant did, under circumstances equivalent to driving his cattle upon the forest reserve. He could have obtained a permit for reasonable pasturage. He not only declined to apply for such license, but there is evidence that he threatened to resist efforts to have his cattle removed from the Reserve, and in his answer he declares that he will continue to turn out his cattle, and contends that if they go upon the Reserve the Government has no remedy at law or in equity. This claim answers itself.

It appears that the defendant turned out

his cattle under circumstances which showed that he expected and intended that they would go upon the reserve to graze thereon. Under the facts the court properly granted an injunction. The judgment was right on the merits, wholly regardless of the question as to whether the Government had enclosed its property.

This makes it unnecessary to consider how far the United States is required to fence its property, or the other constitutional questions involved. For, as said in *Silver v. Louisville & Nashville R. R.*, 213 U. S., 23, "where cases in this court can be decided without reference to questions arising under the Federal Constitution that course it usually pursued, and is not departed from without important reasons." The decree is therefore affirmed.

#### SECRETARY WILSON'S COMMENT.

Secretary Wilson, after reviewing the cases said: "I feel very certain now that these questions are so definitely settled, that we shall have no further trouble in regulating the use of National Forest ranges by live stock. Indeed we have had very little for some time, because the stockmen themselves, although originally inclined to resent the interference of the Government with their long and uncontrolled use of the lands now within these forests, have, recently, accepted the situation and are rapidly realizing that their occupancy of these grazing lands is vastly more satisfactory under present conditions than it was in the old days when these areas were open to all comers and it was a constant struggle to obtain feed for their herds."

## THE APPALACHIAN FORESTS

Offers of land for the new Appalachian national forests are being received at the Forest Service with encouraging rapidity. The prices range from \$1 to \$8 an acre. The Service now has nine men in the field in Georgia, four in North Carolina, and sixteen in the White Mountains, making examinations of tracts that have been offered. On the 12th of May there was introduced simultaneously in the House and Senate by Representative Weeks and Senator Gallinger a joint resolution providing that the appropriation of \$1,000,000 dollars carried by the Weeks Bill for the fiscal year ending June 30, 1910, and \$2,000,000 for the fiscal year ending June 30, 1911, shall be available for use at any time prior to June 30, 1915.

If this resolution passes the two houses it will carry out the original intent of the bill, which was to make a total amount of \$11,000,000 available for the new national forests to be expended before June 30, 1915.

There is in the state of Alabama something over 100,000 acres of public land, much of it in the mountainous counties of Northern Alabama, which it is hoped will be withdrawn from entry in accordance with the precedent established in creating the western national forests, and this will make a good nucleus for national forests in that state.

There has been so much doubt as to the attitude of the Geological Survey in relation to its share in the operation of the new forest law that a statement has been issued by the Director of the Survey, George Otis Smith, which is in substance that the responsibility of the United States

Geological Survey under the act is set forth in section 6, which provides that preceding any purchase there must be an examination of the land by the Geological Survey, with a favorable report to the Secretary of Agriculture "showing that the control of such lands will promote or protect the navigation of streams on whose watersheds they lie." In the agreement between the two departments it is set forth that the responsibility rests upon the National Forest Reservation Commission to determine what streams are navigable or "may be developed for navigable purposes" within the meaning of this act, and upon the Secretary of Agriculture to select the navigable streams to be thus protected.

The Geological Survey, however, is under the law the determinative agent whose certification is necessary to show that control of the land, the purchase of which is contemplated, has some material effect on stream flow and the protection of navigability. The report by the Geological Survey will be based upon the consideration of such questions as whether the tract possesses slope and soil and rock surface of such character that vegetative cover will check or retard runoff, and thereby secure the entrance of the water into the underground circulation; whether the topographic and geologic conditions favor serious surface erosion, in the absence of a protective cover of vegetation, of materials of such a character and contributed under such conditions as to reach the navigable portion of the stream; whether protective cover in the headwater region would prevent loss of storage capacity of reservoirs,

present or prospective, which in turn promote or protect navigation of the stream, and whether, if navigable only on its tidal basin, headwater protection from either flow fluctuation or silt contribution would promote or protect such navigability.

The field examinations of the Geological Survey will be hydrographic, geologic and topographic, and will include the determination of the relation of the headwater streams to the navigable stream to which they are tributary, to which general examination must be joined the local observation of the headwater stream or streams draining the tract in question, with reference to runoff characteristics and to nature and amount of suspended material; the classification of the surface formations of the tract, with reference to permeability and storage capacity and to resistance to erosion, and the securing of such additional topographic data in cooperation with the Forest Service as are needed by the two bureaus in their examination of the tract. All of these inquiries, however, are planned with the sole intention of enabling the Geological Survey to determine the fundamental question presented to it: "Will the control of a particular tract of land, the purchase of which by the Government is proposed, promote or protect the navigation of a particular stream?"

The geological survey's interpretation of its function in the administration of the Weeks law is that it involves a thorough investigation of the physical facts bearing upon the relation of each specific tract to the navigability of the stream on whose headwaters it lies. It is the position of the geological survey that in general forest cover does promote and protect stream flow, but with the multiplicity of widely varying factors that enter into the problem as presented in each different locality the rule cannot be given universal application. In this connection it may be noted that one of New England's foremost civil engineers in urging immediate purchase of lands in the White Mountain region mentions a difference of conditions on two parts of the drainage basin of one of the rivers under consideration, stating that the cutting of forests in the one area could not be considered as affecting navigation on the main river, but making exactly the opposite statement regarding the need of forests on the headwaters of the other tributary. Although it has been definitely reported that the geological survey has condemned at least two of the New England rivers as not being navigable streams within the meaning of the Weeks act, it is pointed out at the geological survey that such a statement contains a double error.

In the first place, the determination of what are navigable streams within the meaning of this act lies with the national forest reservation commission, and in the second place the position taken by the geological survey is that it is not warranted

in prejudging the case of any area and that either a favorable or an unfavorable report must be preceded by actual field examination to determine the essential factors in the local problem. While the survey is in possession of a large amount of data resulting from its many years of field surveys, topographic, geologic and hydrographic, there is no case thus far noted in which the officials of the survey regard the material already in hand as sufficient to constitute the showing required by the Weeks law. It is, however, the survey's purpose to obtain this needed additional information at once, and its field men are starting this week to examine areas in North Carolina and Tennessee, and at conferences in Secretary Fisher's office last week the director of the survey assured Gov. Bass of New Hampshire and Senator Gallinger and Representative Weeks that examination within the White Mountain region would be begun this spring and the investigation continued through the coming field season.

Director Smith expresses himself as altogether sympathetic with the popular demand for forest purchases, and his personal opinion in the subject of the influence of forests upon stream flow was reflected in his contribution to the discussion of the whole subject by the American Society of Civil Engineers over two years ago, but, as he adds, "The very field observations which prompted me to oppose certain generalizations of Maj. Chittenden in his forceful arguments against the existence of any relations between forest and navigation force me to acknowledge on the other hand that forests are not everywhere essential to the regulation of stream flow."

"I have taken a personal interest in the subject of forest conservation, and have always professed my strong belief in the importance of the objects to be served by forest preservation, even though these may be only incidental to the declared purpose of the Weeks act, which is to conserve navigability, and it is on this account especially that I am desirous of not only meeting the present situation wisely, but also of assisting in the future accomplishment of further enactments and appropriations, which end can be insured in my opinion only by the wise administration of the law which was approved by President Taft on March 1."

While there must be general respect for the serious view of his responsibility under the law taken by Director Smith, it may be doubted whether such exhaustive scientific examination was contemplated by Congress or is practically necessary. The question to be determined is much simpler than that. A longer term of years would be necessary to go into the investigations proposed by the Director and there is a public exigency demanding prompt action.

## CURRENT LITERATURE

### REVIEWS

*The Principles of Handling Woodlands.* By Henry Solon Graves, Chief Forester, Forest Service, U. S. Department of Agriculture. pp. xxi, 325. New York, John Wiley & Sons; London, Chapman & Hall, Limited. 1911. Price \$1.50, net.

Our American literature of the theory and practice of forestry is very new and naturally increases slowly. Our foresters have been too busy establishing their profession, doing its hard work, fighting its battles, to put out many books. The United States Forest Service has issued a mass of published material, some of it of great and permanent value, much of it to meet the needs of the hour, and this has been supplemented by the publications of associations and state forest services, but the digested literature of the subject in permanent book form, covering the field of American forestry, is still limited. Nevertheless, it is steadily developing and there is cause for congratulation when any of the recognized authorities among American foresters adds to the list. It is, therefore, with distinct pleasure that we receive a book by the Chief Forester of the United States. Mr. Graves has chosen a subject that needed to be covered and one which from his wide experience with the types and conditions of American silviculture he was peculiarly well fitted to discuss. In his preface the author mentions the need which we have indicated "of systematic works covering the different branches of forestry, for the use of owners of woodlands, for practicing foresters, and students in the forest schools." The present volume is "a contribution to this greatly needed literature of forestry," "covering the silvicultural treatment of woodlands." It is made clear that this phrase covers its field, artificial seeding and planting not being treated. Its standpoint is that of present day conditions, which will be modified as better and more intensive methods come in with increasing values and larger returns from forestry. The author's own statement of his plan should be noted in this connection:

"In the long run the application of forestry in this country will resemble very

closely that in Europe, with such modifications as are required by the peculiar characteristics of our species and our climate. I have laid special emphasis on some of the more primitive methods of forestry because these are often the only methods which can be applied under conditions of poor markets and difficult logging. Thus a prominent place is given to the selection system in its first application to virgin forests; some of the clear-cutting systems, which will necessarily later be replaced by better methods, are described in considerable detail; and more space is given to the primitive application of the shelterwood system than to its fully developed practise in Europe. A number of the European modifications of the various silvicultural systems have not been mentioned at all, as they would have at present only a very limited application in this country."

The various chapters include (1) a general introduction describing American forest conditions, the object and cost of silviculture, classifications and systems; (2) the selection system; (3) systems of clear cutting; (4) the shelterwood system; (5) the coppice system; (6) improvement of the forest; (7) protection of forests from fire, a chapter which is substantially the recent bulletin on the same subject issued by the Forest Service and reprinted in AMERICAN FORESTRY serially last year, and (8) protection from other injurious agencies, first of which and next to fire in magnitude Mr. Graves places the various injurious forest insects. The book has an analytical table of contents and an index.

This is a volume which will be serviceable to either the lay or professional student, although primarily a professional book for professionals. It is clear and direct in style, not unnecessarily encumbered with technicalities, but exact and thorough. So far as the professional foresters are concerned it may safely be assumed that they will consider it a necessary part of their equipment; and beyond that, it may be said that no owner of woodlands or non-professional student of the subject can study it without reaching a clearer conception of the scope and principles of forestry.

*Commercial Geography.* By Edward Van Dyke Robinson, Professor of Economics in the University of Minnesota, former Principal of the Central High School at St. Paul. Rand, McNally and Company, Chicago and New York. pp. XVIII, 455.

In his preface the author defines commercial geography as the study of the localization of industry, the factors involved being nature, man and capital goods, there being, he says, three sets of controls, the natural, human and the economic, which jointly determine the localization of industry. He believes that the study of commercial geography can be made of real scientific educational value. The first part of the work considers the growth and factors of commerce, taking up first its beginnings, then the Mediterranean age, and passing on to consider how commerce depends on land and sea, on climate, on land, and on economic forces. Chapters follow on the development of transportation and on the principal raw materials of commerce. The second part contains chapters on the continents and countries, the final chapter dealing with world industries and the organization of commerce. Some useful statistical tables, and a good index, occupy the last pages. Forests and forestry seem to be given adequate attention. In the second chapter three pages are given to a good, compact statement of the relation of the forest and its economic importance to man and the forests appear afterward in connection with each country having forests of commercial importance. The scope of this book is elementary and necessarily brief but the facts are well and apparently accurately stated and the book fulfills its announced purpose of being suggestive and making the student think. There are numerous maps, good, though small.

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## NATIONAL FOREST WORK

### Forest Assistants Appointed

Examinations have recently been held by the Civil Service Commission for positions as forest assistant, and seventy-two of those who successfully passed the examination have been certified for permanent or temporary appointments and assigned to the different districts. The assignments are as follows:

#### *District 1. Headquarters at Missoula, Montana.*

*Permanent*—Frederick R. Mason, Howard A. Green, John F. Forsythe, Whiting Alden, Kenneth D. Swan, James C. Whitham, Louis R. Stadtmüller, Alfred B. Hastings, Henry W. de Nancrede.

*Temporary*—Otto Katz, Arthur F. Oppel, Waldo D. Barlow, Ernest F. Jones, Samuel R. Donnelly.

#### *District 2. Headquarters at Denver, Colorado.*

*Permanent*—Leigh J. Young, Fred R. Johnson, George Z. Mason, George R. Morrison, Arthur F. C. Hoffman, Myron W. Thompson, George R. Monell, Gordon Parker, W. G. Baxter.

*Temporary*—Huber C. Hilton, Philip L. Buttrick, Jay J. Fltz, Walter A. Hopson, Dwight S. Jeffers, Charles E. Beaumont, Devillo T. Wood.

#### *District 3. Headquarters at Albuquerque, New Mexico.*

*Permanent*—Albert E. Moss, Quincy Randles, John S. Boyce, H. Basil Wales, Otto F. Swenson, John F. Pernot, John W. Spencer, Ernest C. Pegg, Thomas E. McCullough.

*Temporary*—Irving W. Gilson, William C. Koepke, Clifford W. McKibbin, N. Curtis Case, Robert W. Shields.

#### *District 4. Headquarters at Ogden, Utah.*

*Permanent*—J. Warrington Stokes, Edward F. McCarthy, Edwin C. Shepard, Lee O. Miles, Edward J. Hanzlik.

*Temporary*—Hubert C. Williams, Arthur F. Fisher, Charles E. Edwards.

#### *District 5. Headquarters at San Francisco, California.*

*Permanent*—Theodore W. Dwight, Douglas K. Noyes, Edward I. Kotok, Richard H. Boerker, Jesse W. Hough, Neal T. Childs, George W. Lyon, Carl L. Hamilton.

*Temporary*—E. T. Bushnell, Loren L. Bishop, Howard de Forest.

#### *District 6. Headquarters at Portland, Oregon.*

*Permanent*—Arthur F. Karr, Abraham Rosenmond, Walter H. Leve, Frank J. Mosher, L. Wernstedt.

*Temporary*—Lawrence B. Pagter, Carington McFarlane, Percy T. Smith.

The new men are graduates of various forest schools. The assignments are made as far as possible on the basis of the personal wishes of the men, their suitability to certain regions, and the needs for the different districts. The permanent appointments are at \$1,200 annually, and the temporary appointments are made for three months on a basis of \$1,000 annually. The temporary appointments may be made permanent when the exigencies of the Service require.

## SURFACE CONDITIONS AND STREAM FLOW

A delayed publication of the Forest Service has recently appeared—Circular 176 on Surface Conditions and Stream Flow, by William L. Hall, assistant forester, and Hu Maxwell, expert. This report was ready for publication when the chief of the Weather Bureau, Mr. Moore, brought out as a congressional document through the House Committee on Agriculture the remarkable report which was so much discussed at the time bearing on the same subject. Both reports had been held up by the Secretary of Agriculture until the position of the Department could be determined. Now the work of Mr. Hall and Mr. Maxwell is given publicity through the regular department channels.

The circular notes the popular belief that floods in many of our rivers are increasing in frequency and duration, the interest taken by scientific bureaus of the government in the question, and says that both the Forest Service and the Geological Survey have secured data warranting the statement that "unmistakably, floods are steadily on the increase in some of our most important rivers," particularly those rising in the eastern mountains and where surface conditions of the watersheds have been most changed. Specific mention is made of such streams as the Ohio, Cumberland, Wateree, and Santee, where the forest has been destroyed. Streams on which floods have decreased and low waters improved, show conditions which also seem to prove the rule "that there is the closest kind of relationship between the surface conditions of a watershed and the flow of water through the stream which drains it." A table follows giving the records of the Potomac, Monongahela, Ohio, Cumberland, Wateree, Savannah, Tennessee and Allegheny rivers for periods ranging from eight to seventeen years, showing that the high water and low water stages have been intensified in these streams without a corresponding change in precipitation. Figures for the Wabash and Red rivers show that floods have decreased during periods of eight and nine years. After a discussion of these tabulated figures, the circular notes that—

"While the record is given for only eight streams which show increased floods, it must not be understood that these are the only streams which show this tendency; rather, they are examples—particularly they are examples of streams having their source in

the Appalachian Mountains. They have been given because their records are more complete and longer than those for other streams. The records of most other streams of the region, so far as they are sufficient to show a tendency, indicate the same progressive change toward increased floods. For example, this is true of the Alabama River, of the Connecticut, of the Muskingum, and of the Congaree."

Possible causes for the conditions shown by these records are then discussed. The factors affecting streamflow, climate, topography, natural or artificial reservoirs, soil and ground cover, are each considered, climate being understood as embracing precipitation and evaporation with whatever influences them, as wind, humidity, temperature, and altitude.

It is observed that precipitation, which must modify stream flow in a vital way, has not increased over the Appalachian mountain region in any degree corresponding to the high water figures, which "show that on only two of the rivers mentioned in the table has there been any increase and there by small amount while in the other six there has been a decrease, in the case of one stream, the Tennessee, amounting to an average of six inches. The real tendency of the precipitation over these basins would therefore be to decrease flood conditions. Consequently we must conclude that the increase in flood conditions are in no degree due to precipitation."

Since more than half of the precipitation goes off through evaporation, this is an important factor in the problem and it is fundamentally influenced by temperature, air pressure, wind and humidity.

"It is during the prolonged heated periods, which are often dry periods, that evaporation has greatest influence. It undoubtedly affects as much as any other factor the low water stages of the streams, yet by its very nature it cannot much influence floods, because they rise quickly and are never of many days duration. There is not time for much water to evaporate, hence we can put aside this climatic influence just as in this case we have put aside precipitation. We must look elsewhere for the cause."

"Temperature, while influencing stream flow indirectly, through evaporation, also influences it directly. For example the upper watershed of the Monongahela River, in West Virginia, may be considered:

It is February, and there have been several weeks of cold weather; the ground, which is bare of snow, is frozen solid. There comes a heavy fall of snow, or perhaps several, bringing the snow cover to a depth of 12 to 18 inches. Within a few days the weather moderates and a prolonged rainy period follows. The first rain is caught by the snow and little escapes. But as it continues to come, it melts the snow so that the water from the snowfall and the rainfall is concentrated upon the surface at one time. If the ground were not frozen, much of it could be absorbed and distributed downward, but in the case we have assumed the earth is frozen solid, so that no water, or at least but little, can be absorbed. The whole volume is liberated on the surface and races away from the smaller streams to the larger, and at last, gathering in immense quantity, it overtaxes the channel of the main river and inundates the entire valley. It is this condition of rain, snow, and temperature operating together which brings about some of the greatest floods. A flood resulting from such a cause is not likely to occur more than once a year in any stream, and several years may pass without flood on a given watershed from this combination of causes. It can not be said that floods from this cause show any progressive change, and consequently we can not ascribe to this cause the increased flood conditions in the rivers now under consideration.

#### TOPOGRAPHY AND GEOLOGY

A region's topography largely influences its run-off. Steep slopes and sharp ridges shed water quickly. A flat surface causes it to flow away more slowly.

Likewise, geology has a great deal to do with the drainage of any region. When rain has fallen and has passed through the soil cover and the soil it comes in contact with the rocks which lie beneath. In obedience to gravity it will penetrate as deeply as possible. Considering the depth to which it can go and the quantity in which it can be stored, the earth forms a great storage reservoir which tends on most watersheds to have a strong influence toward steadiness in the flow of streams. While topography and geology are important factors in considering the amount and character of run-off when one stream is compared with another, they are of no consequence when one is considering the condition in the same stream during two different periods, because they are subject to no appreciable variation. Both the topography and the geology of any given stream may be said to be constant, and so are not of importance in considering what has caused a changed condition of flow in any particular stream."

The effect of natural and artificial reservoirs, which gather and hold immense volumes of water, such as are found on some

river systems, notably the Merrimac in New England, is noted. And on this point the circular says:

"If at the headwaters of the rivers under consideration in this paper there had been great lakes or swamps which had been drained during the period under consideration, it might well be said that the influence of that action would be sufficient to cause a difference in the run-off of the streams. But, except in the case of the Wabash, there have been no changes of this character. There are on these streams no important natural lakes, and no reservoirs of great extent have been developed. Consequently, this factor also is insignificant."

Soil and ground cover are next discussed as follows: "Though the topography and geology of a watershed change too slowly to be readily observed, there are other factors in which changes may be rapid, radical, and of great importance. One such factor is soil. The soil, when considered as a factor in controlling run-off, is a complicated and delicate apparatus. It works admirably when in good condition, but it is easily deranged and is liable to severe and fundamental injury, by which its action on storm water may be lessened or almost entirely destroyed. Mistreatment frequently produces results of a serious nature in the drainage of a watershed.

"The mineral soil is composed of disintegrating rock that has broken down by the slow process of weathering. Deep mineral soils, if they have not accumulated from transported materials, represent a long period of rest, during which the surface has been free from erosion, while the disintegrating rock beneath has added little by little to the depth. Upon the mineral base, and more or less mixed with it, is the humus, which owes its existence to organic matter mostly vegetable, which has decayed and added the accumulated remnants to the mineral soil. Humus vastly increases a soil's capacity to absorb and store water.

"The important work which soil performs in regulating the run-off for a region is easily understood. If the soil is present in sufficient quantity and good condition, that is, is porous and well supplied with humus, it readily absorbs storm water at the surface and passes it on downward through the underlying rocks and strata. Although these rocks themselves change but little, their storage of water is regulated by the soil and varies with its changes. If the soil is hardened or removed, the amount of water which can be taken in is correspondingly reduced and the amount which is thrown off over the surface into the streams correspondingly increased. A watershed without soil or with a soil which does not readily perform its normal functions, results in erratic streams, which are usually agents of destruction rather than of use. The consid-

eration of the flow of any stream should therefore take particular note of the soil and of the changes in its capacity for water storage.

"Scarcely separable from the soil itself is another factor of equal or greater importance in the disposition of water. This is the ground cover, or, to speak of it more particularly, the condition of the surface of the ground; that is, whether it is barren rock or clay, pasture land, cultivated land, or forest.

The condition of the surface does not influence very much, so far as known, the amount of water which falls. It is claimed by some that the precipitation is greater in the forest than on unforested land, and the figures given in the table at the beginning of this paper seem to indicate a tendency toward lessened precipitation on those watersheds which will presently be shown as having a decreased forest area. However, it is not intended at present to lay any stress upon that point. If the influence of the various factors which affect stream flow have been correctly stated, none of them is sufficient to have caused the increased floods. The natural conclusion is that the increase must be due to changes in the ground cover, or to the ground cover in conjunction with changes in the soil. Is the influence of the ground cover and of the soil sufficient to have caused the results?

"It is generally agreed by those who have studied the subject most thoroughly that the forest offers the best conditions for absorption and underground storage. Next to the forest comes well-cultivated farm land; then meadow and pasture land; while the worst conditions of all are to be found on barren surfaces of stone, clay, or gravel, which because of inferiority are unable to support growth of any kind.

"The reasons why the forest offers the best conditions for absorption and ground storage are several. It does so, in the first place, because the foliage of the trees forms a storage place from which water drips slowly to the ground for a considerable length of time after each rain; because the complex layer of brush, leaves, weeds, mosses, and vines, all in a more or less advanced stage of decay, becomes filled with moisture with each heavy rain and holds it for a considerable time; because, also, the surplus water so stored continues to be absorbed by the upper humus-filled layers of earth; because, further, the temperature is lower and the air more humid in the forest than in the open; finally, because the snow lies there much longer. To these reasons must be added the mechanical power of the roots to go deep into the soil and break up the rocks, thus forming channels for the ready entrance of water into the earth.

"On a level or slightly inclined surface a well-tilled soil may be as effective in ab-

sorbing and holding water as a forest soil. Where the slope exceeds 10 per cent, cultivation does not long go on before erosion sets in, and erosion if unchecked will remove the soil and gully the surface until all fertility has gone and all protective power is lost. Agriculture under right conditions may be an effective means of stream protection; under wrong conditions it may be the greatest menace to the even flow and usefulness of the streams."

From this point we give the language of the circular in full.

#### THE PRINCIPAL CAUSES OF INCREASED FLOODS

"Undoubtedly it is the clearing away of the forest on the mountainous watersheds of the streams which have been described that has caused the great increase in frequency and duration of floods.

"It is a known fact that the forests on these several watersheds have been cut away with great rapidity during the past thirty years. European conditions probably offer no parallel to the rate at which these watersheds have been cleared to make way for the rapid advance of agriculture and to supply the great manufacturing industries with the wood which they require. Forest lands, which offer the best possible conditions for soil absorption and underground storage, those great regulators of stream flow, have been changed to poorly tilled agricultural lands, which are not so good. Then these agricultural lands after a few years have been exhausted and their soil eroded into deep gullies. Finally, many of them have been turned into pasture or even entirely abandoned because they reached a condition where they could not support even a growth of grass and weeds. The best condition has been changed to the very worst condition.

"Again, repeated burning of forest lands has tended to reduce the thickness and value of the ground cover and to lessen the power of the soil to absorb and to store water. The extent of damage from fire, so far as water storage is concerned, is generally vastly underestimated. A forest fire strikes both above and below the surface. It injures or kills the trees, destroys the undergrowth and brush, and consumes the great forest sponge—the ground cover and the humus. The extent of the injury is, of course, not always the same. It is sometimes slight; sometimes very great. Repeated fires tend to every kind of injury that can possibly be inflicted upon a forest soil, completely destroying the cover down to the mineral substances, and thus rendering it defenseless against the attacks of erosion. When that stage is reached, it may be depended upon that the run-off of the watershed has been profoundly affected and the regimen of the stream materially changed. The fact that forest fires have repeatedly swept over the watersheds of the streams under consideration

makes it easy to believe that this factor, combined with the clearing away of the forest for agricultural purposes, has been the chief cause of the intensified flood conditions which the records now disclose.

"Considering the streams which drain the mountain regions, the most vital parts of the watersheds are the highest parts. It is there that precipitation is the heaviest, slopes the steepest, and the whole sum of conditions most influential. Therefore, so far as stream flow is concerned, the mountains are the portion which should be given the most judicious care. It is on the mountains that the best condition of soil and ground cover should be maintained. As the best ground cover, as has already been explained, is the forest, it is to the benefit of the streams that the mountains should be kept densely forested, in order that the conditions for the absorption and retention of moisture may be as nearly as possible ideal. Under such conditions the course of the moisture will be one of continual interference from the time it reaches the crowns of the trees till it is in the stream. Every obstruction that can be placed in the way of the water aids by that much the even flow of the rivers. Under perfect forest conditions it is well-nigh impossible for any surface run-off to take place. The rain first comes into contact with the crowns of the trees, and the drops are broken more or less into spray. Some of the intercepted water runs down the trunks or drips from the branches. That which escapes interception by the trees encounters the undergrowth and brush immediately above the ground and is intercepted and retarded. As the water continues to make its way downward the ground litter offers the next obstacle. The water is caught up by the litter, and not until this has become saturated can the water pass on. If the rain continues for some time the litter becomes filled to its capacity, and then the humus begins to absorb the water which the litter can not hold. After a time it, too, becomes saturated. The water then gradually filters into and through the underlying soil. If this is deep it stores waters in large quantity and then allows the surplus to pass to still greater depths, where it finally penetrates the rock strata and replenishes the great underground reservoir, from which it emerges later as springs, some of which may be far removed, even on the opposite side of the mountain, from the place where it has come in contact with the ground. If the precipitation is in the form of snow its course is substantially the same, but with a still greater delay in passing through the litter and entering the soil. The period that may elapse between the fall of rain and the appearance of water in a river varies from minutes to months or even years.

"Even with the best regulated system of

checking and storing the rainfall a condition may arise where, to a large extent, the effect of obstruction and storage in a forest may temporarily be lost. Severe and prolonged freezing may result in a sheet of ice in and over the upper soil, which prevents the entrance of water, and whatever falls in the form of rain must at once run off into the streams. Many rivers experience their worst floods when their drainage basins are frozen. On account of this condition it is impossible to claim that extreme floods will not come in a stream with a forested watershed. Fortunately the condition arises but seldom.

"In such cases the conditions are similar to what they would be were the covering of the soil removed. The disastrous floods which come once or twice in a generation when heavy rains descend upon snow and frozen ground would probably be duplicated or surpassed yearly, or several times a year, were the soil stripped from the mountain regions. The heavy rains of summer which now fall upon a dense vegetation and hardly affect the larger rivers would then produce destructive floods.

The table on a preceding page gives data regarding the flow of 10 important rivers of the United States. It has not been possible to obtain for each watershed a record of the changes which are believed to be responsible for the increased flood conditions which the record shows. It has been possible to make a detailed study of parts of the watersheds of two of the streams, the Cumberland and the Red.

#### *A Watershed Where Conditions Have Grown Worse*

"The Cumberland River is a good example of how conditions have changed for the worse on some of these watersheds.

"The drainage area of the Cumberland River above Burnside, Ky., comprises 3,739 square miles and lies in the heart of the Cumberland Mountains. The figures given in the table show that floods have increased in the Cumberland River at Burnside, Ky., in number from 32 in the first half to 43 in the second half, and in duration from 89 days in the first half to 102 days in the second half, while low waters have increased in times from 61 in the first half to 65 in the second half, and in days from 1.261 in the first half to 1.576 in the second half.

"The removal of the forest on this watershed is progressing from three causes: (1) Clearing for agriculture; (2) lumber operations; (3) fires.

"In 1890, when these measurements were begun, 21 per cent of the watershed above Burnside was cleared; in 1908 the cleared area had grown to 32 per cent. During the eight years 1900 to 1908 clearing of forest for agricultural purposes went on on this watershed at the average rate of five-eighths of 1 per cent per year.

"The total stand of timber on this part of the Cumberland watershed is 6,212,531,000 board feet. It is being cut away by lumbering alone at the rate of 4 per cent a year. These figures show that timber is disappearing on account of lumber operations eight times as fast as it is removed to clear land for farming purposes. In other words, supposing that lumbermen would cut clear as they go, 8 acres would be stripped for timber to 1 cleared for agriculture. The forest is not being cut clear. Instead, the lumberman is going over it time after time, picking out the particular kinds or classes of timber that he wants. First, he took the walnut and cherry; next, the white oak and poplar; now he is taking the chestnut and other kinds of oak. At the present time few tracts can be found from which one or more of the valuable timbers have not been culled. Other tracts have been stripped of nearly their entire growth.

"At intervals of from one to five or six years fires run through the woods on the hills and mountains where the Cumberland River has its source. The fires are more frequent and destructive in districts where part of the timber has been cut and the refuse left on the ground. The dry ridges burn oftener than the coves, because the latter are sometimes too damp for burning. In times of prolonged drought, however, fires run through the ravines and coves where the densest growth is found. The fires are usually slow, and the damage to mature timber is not great, but the injury to the young growth is frequently excessive, and soil damage is serious. As a rule all seedlings and sprouts less than four or five feet high are killed, and, since fires come at intervals so frequent that the young growth can not attain a size above that, a large part of what would be the future forest, as well as the present ground cover, is destroyed. The surviving stand thus becomes thinner year by year, since it can not be replenished by young growth, and since the mature trees are steadily falling by natural decay or by the ax.

"Though the fires are slow and small, they burn the leaf cover and the upper layers of humus at each visitation. This removes or injures the porous surface, one of whose essential functions is to arrest the storm water falling upon the slopes and afford it an opportunity to sink into the ground. With the packing of the surface, after the litter and humus have been burned away, the water flows down the slopes and quickly reaches the streams, where, if in sufficient quantity, it produces flood conditions. Low water follows, because the hard ground is able to take in but little of the storm water to be paid out slowly afterward.

"The behavior of the Cumberland River shows a direct and positive relation between the run-off and the changed condi-

tion of the surface. The changes due to agriculture and lumbering can be definitely stated, but the extent and effect of forest fires are not subject to exact calculation. Yet undoubtedly all of these influences are active in producing the results as shown in the flood and low water records at Burnside. It is impossible that these results should be due to rainfall, because the rainfall was approximately 10 per cent less in the second half of the period. Since no other influences could have produced the result, there is no conclusion possible other than that the progressive floods and low waters have been due to the changes accomplished on the surface of the watershed.

#### *A Watershed Where Conditions Have Grown Better*

"The fact that man by his operations may decidedly change the regimen of a river is shown not alone by those streams whose flow has been influenced by clearing away the forest. It is shown, on the other hand, by streams whose watersheds of prairie soil compacted for ages by the trampling of buffalo, and more recently by cattle of the great ranches of the West, have been to a large extent brought under cultivation.

"A stream which shows this tendency in an unmistakable way is the Red River, which forms the boundary for many miles between Texas and Oklahoma. On this stream records of flow are available for sixteen years. The number of floods in the first half of this period was 19; in the second half, 16. The number of days of flood in the first half was 87; in the second half, 60. Considering also the low-water periods of this river, we find that in the first half of the period there were 49 periods of low water; in the second half there were 8. In the first half the duration of low water was 826 days; in the second half, 208 days. A falling off in the rainfall occurred on this watershed, there being 1.94 inches less water per year in the second than in the first. Its drainage basin is, and has been during the time of its known history, practically without forests, only 1 acre in 10 being forested. In that respect it differs from all eastern and many western rivers whose basins are more extensively forest covered.

"Why has the Red River constantly changed its flow toward steadiness and uniformity, while many other rivers have changed in exactly the opposite direction? The area of the Red River drainage basin above Arthur City, Tex., where the records were made, is 40,200 square miles, divided almost equally between Oklahoma and Texas. In this river, as in those before mentioned, the geology and topography have not changed. The precipitation has changed considerably in the direction of lessened rainfall, but not enough to ac-

count for the record. In soil conditions, and especially in the condition of the surface, however, the change has been marked. At the beginning of the period of measurement, in 1890, the country was for the most part occupied by large ranches. The native prairie sod had never been broken up.

"On the part of the watershed lying in Texas there had been some settlement at an early date, but as late as 1900 no more than 12 per cent of the Texas part of the watershed had been improved. In the Oklahoma part of the basin, in the same year, the improved portion was 16 per cent. Development began most extensively about 1900. In southwestern Oklahoma, in that portion drained by the Red River, it was stimulated by the opening of Indian reservations to settlement. The Cheyenne, the Arapahoe, and the Wichita lands were opened, it is true, in 1890, but the real opening of the country to settlers came in 1901, when the Comanche, the Apache, and other Indian lands were opened, aggregating over 10,000 square miles, or more than one-fourth of the entire Red River basin above Arthur City. Another tract of over 8,000 square miles, the Choctaw and Chickasaw lands, began its development about the same time. A summary of these figures shows that in 1908 the Red River basin in Oklahoma had 10,200 square miles of improved land, instead of 3,284 square miles in 1900. Statistics are not complete for the Texas portion of this basin but the Texas portion has developed at about the same rate as the Oklahoma part. It is probable that the whole Red River basin above Arthur City, in Texas and Oklahoma, had 40 per cent of its land under improvement in 1908, instead of 14 per cent eight years earlier.

"The results which have appeared in the form of change of the flow in the Red

River are precisely what ought to be expected from the changes in surface conditions. Theoretically, such results should appear, and as a matter of fact, they have appeared. The hardened prairie soil has been broken up and changed into cultivated fields over 40 per cent of the area, and thereby the absorptive capacity of the soil has been much increased. Over the remainder prairie fires have been kept out and better growth of grass secured. The extensions of cultivation and the improvement of the grass land has tended to equalize the flow of this river. The river's behavior has become better as the area of wild land has decreased. In other words, wild, barren land, being the worst condition for the protection of a watershed, and cultivated farm lands being next to forests the best condition, the change of a large part of the watershed from the worst condition to the next to the best condition has brought about this result.

"The same law is thus seen to work on both the Cumberland and the Red River watersheds, but in different directions. On the Cumberland, as the watershed changes from the forest (the best condition for stream protection) to farm land, to pasture land, and even to barren condition (the very worst condition for absorption), the flow of the river is made more extreme, both as to floods and low waters. On the Red River watershed, beginning with a wild, almost barren, compacted surface, cultivation has changed the condition to that of permeable farm lands, which, next to forests, offer the best conditions. These two extremes exemplify, therefore, in different directions, the working of the same law—that there is a vital relation between the condition of the surface of the watershed and the manner of flow of the stream which drains it."

## NEWS AND NOTES

### Forestry Meeting at Bretton Woods

The Society for the Protection of New Hampshire Forests will hold its annual meeting this summer at Bretton Woods on the 2nd and 3rd of August. The headquarters will be at the Mount Pleasant Hotel, where a special rate of three dollars and a half a day has been given for those who attend the meeting. President Taft has been invited to be present and may do so. The National Forest Reservation Commission, appointed under the new forest law, has also been invited to hold a meeting at the same time and place. The Directors of the American Forestry Association are contemplating holding a summer

meeting at the same time and may arrange for a field meeting of the Association conjointly with the New Hampshire Society. Those who have experienced the pleasure of a stay in the heart of the White Mountains will appreciate the attraction which this meeting offers.

### Minnesota State Forest Service

The State Forestry Board under the new forestry law which was published in AMERICAN FORESTRY last month, has appointed William T. Cox, assistant forester, United States Forest Service, chief forester, and D. P. Tierney assistant.

Mr. Cox is a native of Minnesota where

he was born near Glenwood in 1878. He spent his boyhood on a farm, attended a district school and graduated from the Glenwood High School. He studied telegraphy and for a year and a half was employed as agent and operator on the "Soo Line." Subsequently he taught school for three terms. In the summer of 1901 he entered the Bureau of Forestry as student assistant, being assigned to duty on the Big Horn Forest Reserve, Wyoming. In the fall of 1901 he resigned to enter the University of Minnesota, but in 1902 he assisted, as a member of a Bureau party, in the study of drifting sands along the Columbia River, to determine their source and to devise methods of controlling them. That autumn he investigated the extent and damage of the big forest fires which occurred during that season in western Washington and Oregon, preparing maps of the burned areas. His report was published in "Forestry and Irrigation" and the estimates given of timber destroyed have been verified since by later figures of lumbermen in that region. After spending a portion of the winter of 1902-3 in the office at Washington, he was assigned to the study of forest fires in the South. In the summer of 1903 he examined lands for proposed forest reserves in Oregon and Washington, continuing this work in 1904 in Idaho. During the winter of 1904 he resumed his studies in the University of Minnesota, completing the technical training offered in forestry. In the spring of 1905 Mr. Cox passed the Civil Service examination for forest assistant, a position to which he was appointed the following July. On August 1 he was assigned to assist in the office of the Forester, giving special attention to reserve boundary work and miscellaneous correspondence. Mr. Cox has been regarded as one of the most proficient men in the Service and will be a most competent administrator of the excellent new forest law which Minnesota has adopted to protect one of its largest interests. He has already taken up his new position.

General C. C. Andrews, formerly State Forestry Commissioner, to whom forestry in Minnesota and in the United States owes so much, is the secretary of the new forestry board.

#### **Oregon's New Forest Law**

The state forester has issued a digest of the new forest law of the state as follows:

Any and all inadequately protected forest or cut-over land adjoining, lying near or intermingling with other forest land and covered wholly or in part by inflammable debris or otherwise likely to further the spread of fire, which, by reason of such location or condition or lack of protection, endangers life or property, is declared a public nuisance, and whenever the state forester shall learn thereof

he shall notify the owners or persons in control or possession of said land, requesting them to take proper steps for its protection and advising them of means and methods to that end.

#### **Fire Wardens to Enforce Law**

All fire wardens, under instructions from the state forester, shall take proper steps for the prevention and extinguishment of fires within their localities, assist in apprehending and convicting offenders against fire laws, control the use of fire for clearing land in the closed season, and make such reports as may be requested by the state forester. They have power to make arrests for violation of forest laws and to enter upon the lands of any person or owner in the discharge of their duties; provided, that in so entering they exercise due care to avoid doing damage. Any fire warden who has information which would show with reasonable certainty that any person has violated the forest laws, shall immediately take action against the offender by arresting or making complaint to the proper magistrate or by filing information with the district attorney, and shall obtain all possible evidence. Wardens are punishable by both fine and imprisonment for failure to comply with their duties.

#### **Closed Season for Burning**

Burning of slashing, chopping, woodland or brushland is unlawful between June 1 and October 1, without written or printed permission from a fire warden and strict compliance with terms of the permit which shall give condition to be observed. This restriction does not apply to burning of log piles, stumps or brush heaps in small quantities, under ample precaution and personal control, and in accordance with any regulations of the state board of forestry. If any burning without permission results in the escape of fire or injury to another, such escape and injury shall be proof that the burning was in violation of the law. Violations of this provision are punishable by \$25 to \$500 fine or ten days to three months' imprisonment. Any fire warden may revoke or postpone permits when necessary to prevent danger to life and property. Any permit obtained through wilful misrepresentation is invalid and no defense from penalties of the law.

#### **Governor May Suspend Permits**

In times and localities of unusual fire danger the governor, with the advice of the state forester, may suspend any or all permits or privileges and prohibit absolutely the use of fire herein mentioned. He may, in certain emergencies, suspend the open season for shooting game, by proclamation, and for such time as he may designate, during which all laws of closed season shall be in force.

In times or localities of particular fire danger, or to enforce the fire laws or apprehend and prosecute violators thereof, the state forester may appoint or employ, independently or jointly with other agencies, such additional fire wardens, and to furnish these such assistance and facilities for protecting life or property from fire as he shall deem public safety demands, and unless contributed to by other sources, the cost thereof shall be paid from the funds appropriated by this act, but each county in which such service is given shall be responsible for one third the expense thus actually incurred and paid by the state for services within said county, and upon demand by the state treasurer shall pay the amount thus due the state treasury to be credited to the fund appropriated by this act.

Setting fires or causing fires to be set on land of another without permission of the owner; wilfully or negligently allowing fire to escape from a man's own land; accidentally setting fire on land of his own or of another and allowing it to escape without using every effort to extinguish it, are punishable by \$50 to \$100 fine or one month to one year imprisonment.

#### *Camp Fires Permitted—When*

Camp fires may be built in a careful manner on uninclosed land if same is not forbidden by personal or posted notice of the owner, but fire must be totally extinguished by the builder before departing. Ground around camp fires must be cleared of all material which will carry fire, and fires must not be left burning or unattended or permitted to spread on land of another, under penalty of fine or imprisonment.

Back fires are permitted if set in good faith to prevent the progress of fire already burning.

The use of inflammable gun wadding in firearms discharged on land of another is punishable by fine or imprisonment.

#### *Spark Arresters on Engines*

Adequate spark arresters must be kept in constant use and repair during the closed season—June 1 to October 1—on all locomotives, logging engines, portable engines, traction or stationary engines using fuel other than oil in or near forest or brush land under penalty of \$25 to \$100. Escape of fire from any such engine is proof of violation of law, and each engine not equipped with required spark arrester is deemed a separate offense.

All annual slashings by those engaged in logging or permitting logging on their lands must be burned each year and the fire confined to the lands of those doing the burning. If burned between June 1 and October 1 all dead trees or snags over 25 feet high must be cut down. Such burning is also subject to the provision of section 8. Penalties are \$100 to \$1,000.

State forester may suspend these restrictions where public safety permits or requires, but may have such burning done at the expense of the offender who fails to comply with the law after proper notice.

#### *Keeping Out Debris*

All inflammable material resulting from clearing or construction of trails, roads and railroads must be immediately destroyed or removed unless prevented under the provisions of section 8. Those operating railroads with coal or wood fuel shall annually, or when directed by the state board of forestry, destroy or remove all inflammable material from their rights of way, in accordance with the directions of said board.

Setting fire unlawfully with intent to injure property of another is deemed a felony and is punishable by one to ten years in the penitentiary.

In addition to the penalties of this law, damages may be recovered, in civil action, brought by persons whose property has been injured or destroyed, against those responsible, to the extent of double the amount of damages if fire occurs through wilfulness, malice or negligence. But if fire was accidental or unavoidable action shall lie only for actual damage.

Persons or corporations causing fire in violation of this law are liable for the full amount of all expense incurred in fighting such fires.

#### *Reward for Information*

One half of the fine paid by any one convicted of violating this law will be paid to any person, not employed and compensated as a fire warden, who furnishes information leading to the arrest and conviction.

All fines imposed under this law, less cost of collection and information, shall go to the county in which conviction is had.

#### *District Attorney to Prosecute*

The district attorney must prosecute with all diligence and energy whenever an arrest is made for violation of this law within his district, or whenever an evidence is lodged with him showing with reasonable certainty any such violation. Failure of the district attorney to act is punishable by \$100 to \$1,000 fine. The same penalty applies to justices of the peace who refuse or neglect to issue warrants for the arrest of persons when complaint under oath has been lodged with them.

Wilful destruction of any notice posted in compliance with this law is punishable by \$10 to \$50 fine or imprisonment one day for each \$2 thereof.

Boards of county commissioners may appropriate money for forest protection under the provisions of this law, and expenses so incurred shall be a proper county charge.





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